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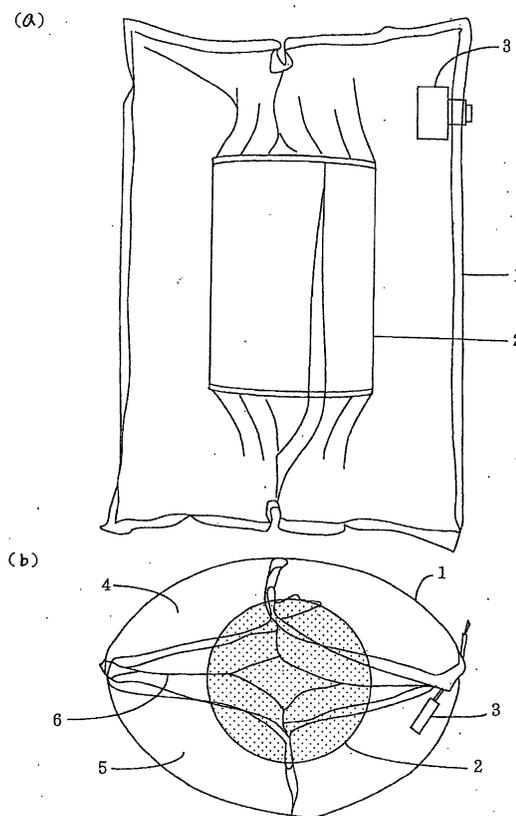
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(54) **INFLATING TYPE CUSHIONING PACKAGE BODY**

(57) An air bag, comprising an automatic closing check valve and at least a pair of air chambers each formed of a flexible sheet and opposed to each other, wherein, after an object is stored in a space hold between these opposed air chambers, gas is filled into the air chambers so that the object can be pressed and held by the inflation of the two air chambers opposed to each other.

Fig. 1



Description

Technical Field

[0001] The present invention relates to an inflatable type shock absorbing package body, which can be used repeatedly.

Background Art

[0002] Hitherto in the past, when glass products and porcelains which are breakable, for example, by shock or precision parts and the like which dislike vibration are transported, damage thereof has been prevented by using various types of inflatable bodies. For example, as an example of such shock absorbing material, it is known that there are plastic forms such as inflated styrene, urethane form and the like, foamed beads and string-shaped bodies made of the plastic forms, papers such as corrugated cardboard, air-mats in which small air-chambers are lined-up, other mats in which liquid is filled and the like.

[0003] However, any of the shock absorbing materials had not sufficient effect of holding the goods to be transported steadily at a predetermined position and giving no shock nor any strong vibration to the goods to be transported and, moreover, has been required to be formed every time according to the shape of the goods to be transported and, therefore, had a drawback of making a mass production difficult due to complicated constitution.

[0004] Besides, the shock absorbing materials which are apt to be scattered have been used, so that there have been drawbacks such as disposal thereof after use being annoyance, reuse thereof being not possible and recycling of precious resources being difficult.

[0005] Thus, hitherto in the past, there have been disclosed shock absorbing materials utilizing air bags such as represented by Japanese Utility Model Application Laid-Open No. 4-27771. Each of these materials had a plurality of air bags formed in a cylindrical shape and inserted a material body into the inside thereof and filled the inside with air so as to hold the material body by expansion. These bags were provided with a check valve and were constructed in such a manner that air once filled was not leaked.

[0006] However, since the check valve using the conventional inflatable shock absorbing material had not sufficient performance, and was not able to completely prevent the leakage of air by a simple mechanism, it was not able to sufficiently exert a function as the shock absorbing material due to shrinkage of the air chambers followed by elapse of time.

[0007] Hence, an inflatable body according to the invention aims to solve the above described drawbacks of the conventional examples and to provide an inflatable type shock absorbing package body, which holds the goods to be transported steadily at a predetermined po-

sition, and which not only gives no shock nor any big vibration to the goods to be transported, but also can be usable regardless of the shape of the goods to be transported and can still maintain such a performance for an extended period of time.

Disclosure of the Invention

[0008] That is, the inflatable type shock absorbing package body according to the invention is an air bag comprising an automatic closedown check valve and at least a pair of opposed air chambers comprising flexible sheets, wherein both sides of a passage body capable of opening and closing and comprising flexible sheets are clipped by a support body in a state of being curved at a predetermined curvature and an elastic material adherable to this support body, or alternatively the passage body and the elastic material are clipped by the support body in the shape curved at a predetermined curvature and a lid body and connected together by connecting means, and the elastic material is pressed along the support body in a curved state by the lid body at a predetermined curvature so that the passage body is closed in a normal state, and when a bar-shaped body is inserted into the inside of the passage body between the support body and the elastic material, the elastic material is deformed so that the passage body is opened, and when the bar-shaped body is extracted, the elastic material adheres to the support body by resilience so that the passage body is closed, and wherein, after a material body has been stored in a space clipped by the opposed air chambers, a gas is filled into the air chambers, thereby bearing down the material body by the expansion of the opposed two air chambers and holding it.

[0009] Further, a pair of opposed air chambers has the following characteristics.

(1) One piece of a twice-folded flexible sheet is clipped by two pieces of the flexible sheets, and the air chambers are formed by welding the periphery thereof.

(2) One piece of the twice-folded flexible sheet is clipped by another one piece of the twice-folded flexible sheet, and the air chambers are formed by welding the periphery thereof.

(3) A cylindrical flexible sheet is twice folded, and the air chambers are formed by welding the periphery thereof.

(4) One piece of the flexible sheet is twice folded, and is further twice folded, and the air chambers are formed by welding a superposed portion of end portions thereof.

(5) The air chambers are comprised by communicating through an air passage.

(6) The air chambers are comprised by being separated at desired intervals.

(7) The air chambers are comprised by inserting an air passage refraction preventive member into the

inside of the air passage.

Further, the air chambers have the following characteristics.

(8) A small air chamber which communicates with a pair of opposed air chambers is formed by being divided by welded lines continued like broken lines by a plurality of air passages which line up in tandem in the longitudinal direction of the package body.

(9) Among the flexible sheets constituting the inflatable type shock absorbing package body, the sheet which becomes an outer skin is thicker than the sheet which becomes an inner skin.

(10) Among the flexible sheets constituting the inflatable type shock absorbing package body, the sheet which becomes an outer skin is higher in mechanical strength than the sheet which becomes the inner skin.

[0010] According to the invention, a high performance automatic closedown check valve is used so that the goods to be transported are steadily held at a predetermined position and, moreover, not only no shock nor any big vibration is given to the goods to be transported, but also the package body can be used regardless of the shape of the goods to be transported and, moreover, such a performance can be kept for an extended period of time.

[0011] Further, when the package body is repeatedly used, since the automatic closedown check valve has a sufficiently sustainable durability, the performance as a shock absorbing material can be kept for an extended period of time.

Best Mode for Carrying out the Invention

[0012] Hereinafter, embodiments of an inflatable type shock absorbing package body according to the invention will be described based on the drawings.

[0013] Figure 1 is a front view (a) and a bottom view (b) of the inflatable type shock absorbing package body according to the invention.

[0014] In the drawing, an object 2 like a tea caddy is inserted. Reference numeral 3 denotes an automatic closedown check valve (hereinafter, referred to as a check valve).

[0015] That is, as shown in the same drawing (b), air chambers 4, 5 are arranged face to face and constitute a nearly cylindrical body in the state (normal state) prior to air being filled into the air chambers. The air chambers are communicated and the check valve 3 is provided on the other side thereof.

[0016] when the object (a cylindrical body 2 in the drawing) is inserted in the normal state and air is filled from the check valve 3, both of the air chambers are gradually inflated, and a sheet 6 which constitutes an inner wall adheres to the object 2. When air is sufficiently filled into the air chambers, the object 2 is fixed nearly

at the center of the package body 1.

[0017] Figures 2 to 5 explain several structural examples of the inflatable type shock absorbing package body according to the invention.

[0018] Figure 2 is a first structural example and shows a case where three pieces of flexible sheets are used. First, three pieces of flexible sheets totaling one piece of the sheet (7) constituting an inner wall twice-folded and two pieces of flat plate like sheets (8A, 8B) constituting an outer wall are prepared. (a) As for the dimension of the sheet, a width A of the twice-folded sheet 7 is smaller than the widths A of other sheets 8A, 8B. This is because, when three pieces of the sheets are superposed and the periphery thereof is welded, a folded portion 9 of the sheet 7 is not welded so that that portion is made to be a communication portion of the air chambers.

[0019] The three sheets adjusted to such a dimension are superposed as shown in the same drawing (b) and are welded along the periphery of the sheets 8 (arrow mark portions). At this time, the check valve 3 is provided between the sheets 7 and 8. When welding, more practically, the sheet 7 has all end portions welded together with the sheets 8 except for the twice-folded portion 9.

[0020] Note that, though in the drawing, the check valve 3 is provided on the folded portion of the sheet 7, as shown in (c), it may be, of course, provided on the end portion at an opposite side. Even in that case, the folded portion 9 of the sheet 7 is not welded with the sheets 8 so that it may be secured as an air communication portion.

[0021] The same drawing (d) is a front view of the package body in the normal state, and (e) is a sectional view of the package body, which is in a state of having crushed a cylindrical body.

[0022] Note that the material of the flexible sheet can be selected from a plastic sheet, a metallic sheet or a composite sheet made of these sheets as components. As for an example of the plastic sheet, polyethylene, polypropylene, polyester, polycarbonate, nylon resin and the like can be cited. These flexible sheets or composite sheets are taken as materials, and two pieces of the material sheets are bonded together and the periphery thereof is heat-sealed at a predetermined width, so that the sheets are heat-welded and formed. Alternatively, for example, the material in which the outside layer is polyethylene or polypropylene, and the inner layer is nylon resin or polyester, a so-called a laminated material having a multi-layer structure may be taken as the material.

[0023] Note that, though the following embodiments assume that laminated materials are mainly used, it is necessary to work out a plan for welding according to each material to be used in the process of the welded portions, since nylon is unable to be welded with each other.

[0024] Figure 3 is a second structural example and

shows a case where two pieces of the flexible sheets are mutually twice-folded and used.

[0025] First, the sheet 7 constituting the inner wall and the sheet 8 constituting the outer wall are prepared (a). With respect to each width size (A), (B), the width in the sheet 8 is larger than that in the sheet 7. This is because of the same reason as that of the structural example shown in the preceding drawing.

[0026] Each sheet is twice-folded and each end portion is arranged face to face. The sheet 7 is inserted into the twice-folded sheet 8 (b) and moreover, the check valve 3 is inserted and welded along the periphery of the sheet 8 (c).

[0027] The same drawing (d) is a front view of the package body in the normal state and (e) is a sectional view thereof, which is in the state of having crushed a cylindrical body.

[0028] Figure 4 is a third structural example and shows a case where a cylindrical sheet is used. First, the cylindrical sheet like (a) is prepared, and the check valve 3 is inserted in the end portions and the two end portions 10 are welded.

[0029] The same drawing (d) is a front view of the package body in the normal state and (e) is a sectional view, which is in the state of having crushed a cylindrical body.

[0030] This is the most simplest constitution. Since an inner sheet adheres to an outer sheet at the folded portion, the communication of air of the air chambers is not sufficient, and even if air is filled, the air chamber only, in which the check valve 3 is located, has a strong tendency to expand.

[0031] Figure 5 is a fourth structural example and shows a case where the package body is constituted by one sheet only.

[0032] One piece of the flexible sheet which provides a portion 7 constituting the inner wall as shown in the drawing (a) and a portion 8 constituting the outer wall is prepared.

[0033] Subsequently, as shown in (b), by clipping the check valve 3, it is twice-folded, and is welded along the end portions. Further, this is twice-folded as shown in (c) and (d), and the end portions 12 are welded.

[0034] The same drawing (d) is a front view of the package body, and is in a state of having crushed a cylindrical body.

[0035] In this example, the reason why the dimensions of the portion 7 and the portion 8 are made different so as to provide the end portion 12 is because, for example, this flexible sheet is the composite sheet and, in the case where the near side of the paper is made of a heat-weldable material such as polyethylene and polypropylene and the rear side of the paper is made of the material not heat-weldable such as nylon, it is necessary to combine the materials mutually heat-weldable. Accordingly, in the case where a single material which is heat-weldable is used, the dimensions of the portion 7 and the portion 8 are quite the same and there is no

need to form the end portion 12.

[0036] Figures 6 to 15 show one example of the check valve to be used for the inflatable type shock absorbing package body according to the invention.

[0037] In Figure 6, reference numeral 101 denotes a passage body, which constitutes an essential part of the check valve and is made of the flexible sheet and capable of opening and closing. The passage body 101 can be prepared by bonding two pieces of the flexible sheets, and a passage portion 102 can be opened in a cylindrical shape. On both sides of the passage portion 102, a stopper 103 which maintains the passage body 101 by clipping it between the support body and the elastic body is formed. Reference numeral 104 denotes a guide portion of the passage body 101 which is protruded from the position of the stopper 103.

[0038] With respect to the above described passage body 101, it is desirable that the flexible sheet to be used is selected from a rubber sheet, a plastic sheet, a water-resistant paper, a water-proof paper, an aluminum foil or a composite sheet made of these sheets and papers.

[0039] In Figure 6, (a) and (b) show a state in the case where the passage portion 102 of the passage body 101 is closed, and (c) and (d) show a state in the case where the passage portion 102 of the passage body 101 is opened and a gas is passing through thereof.

[0040] Figure 7 shows a case where the passage portion 102 of the passage body 101 is bonded with two pieces of the flexible sheets and heat-welded. In the drawing, (a) shows the taper-shaped passage portion 102 which becomes narrower toward an opposite side of the guide portion 104. (b) shows the cylindrical passage portion 102 which becomes narrower toward the opposite side of the guide portion 104 and, moreover, the top thereof becomes cylindrical. (c) shows the cylindrical passage portion 102 which becomes narrower after having a predetermined width and, moreover, the top thereof becomes cylindrical. (d) shows the passage portion 102 which is formed in the cylindrical shape having the same diameter as that of the guide portion 104.

[0041] The width of the passage portion 102 of the above described passage body 101 is desirable to be adjusted to such a level that the passage of the gas is not forced and yet a whole of the check valve 3 is not large-scaled. Of course, when a filling operation is performed by a bar-shaped body such as a straw, the passage portion is desirable to have a dimension corresponding to the diameter of the bar-shaped body to be inserted.

[0042] As for means for forming the passage portion 102 in the above described passage body 101, means for bonding and heat-welding two pieces of the flexible sheets at the stopper portion 103 is desirable, but, of course, other forming means can be acceptable. When the stopper 103 is welded, it is just enough to weld a boundary with the passage portion 102 only.

[0043] Figure 8 (a) to (b) show an example of the support body and the elastic body for clipping, opening and

closing and, in particular, sealing the above described passage body 101. The support body 105 is formed separately from the elastic body 106 (not shown). At the end portion of the support body 105, the lid body 108 is formed in such a manner as to extend to the left and right through a plastic hinge 107. It is desirable that the support body 105, the plastic hinge 107 and the lid body 108 are formed to predetermined shapes by an injection molding of plastic materials comprising polyethylene, polypropylene, polyester, polycarbonate and the like. Of course, the molding method is not necessarily limited to the injection molding.

[0044] In Figure 8 (a), retaining guides 109 are protruded on both sides of the upper portion and both sides of the lower portion of the support body 105. Further, at the center of the upper end of the above described support body 105, an insertion guide 110 is provided at an inserting position of the bar-shaped body.

[0045] In an example of Figure 8(a), the above described lid body 108 has a circular sectional guide groove 112 storing the passage body 101 formed, where the bar-shaped body is inserted nearly at the center of a flat plate, and, on both sides thereof, a pair of ribs 113 for bearing against the sheet like elastic body 106 are formed along the longitudinal direction of the passage body 101. The length and the shape, the position and the number of ribs 113 can be decided adequately according to the width, the size and the like of the above described elastic body 106. However, it is desirable that the length and the shape, the position and the number be given sufficiently enough so as not to damage an opening and closing reaction of the elastic body 106.

[0046] Further, reference numeral 114 denotes a hook provided on the end portion of the lid body 108 for connecting the support body 105. The hook 114 is fit into a socket 115 provided on the end portion of the support body 105 in such a manner as to penetrate into a thickness direction thereof, and not to be extracted from there. In this way, by fixing the support body 105 and the elastic body 106 with the lid body 108 in a curved state at a predetermined curvature, the check valve 3 having an extremely excellent durability can be obtained.

[0047] In the example of Figure 8 (b), the lid body 108 has the ribs 113 for bearing against the elastic body 106 on both sides of the guide groove 112 formed perpendicular to the longitudinal direction of the passage body 101.

[0048] In the example of Figure 8(c), the lid body 108 continues to the center circular sectional guide groove 112 in the form inclining inside along the support body 105 from both sides, and the ribs 113 to bearing against the above described elastic body 106 are not formed.

[0049] Although connecting means comprising the hook 114 and the socket 115 has been illustrated as above, not only such connecting means, but also means for sealing the check valve 3 in a cylindrical sheet, or means such as heat-welding and other shapes and

structures can be used.

[0050] Note that the above described support body 105 and the lid body 108 may have the same thickness or different thickness, respectively. When it comes to a relation to the passage body 101, the support body 105 and the lid body 108 are required to have a thickness to such a degree of not being deformed, and the passage body 101 is required to use a body having a thin thickness as it needs flexibility, and the elastic body 106 is required to have a predetermined thickness due to its function. Of course, the elastic body 106 is desirable to be thicker than the passage body 101.

[0051] The materials of the above described passage body 101 and the elastic body 106 can be selected from a plastic sheet, a metallic sheet or a composite sheet made of these sheets as components. As for the example of the plastic sheet, polyethylene, polypropylene, polyester, polycarbonate and the like can be cited. In this case, it is desirable that the passage body is made of the same material.

[0052] As for the thickness of the above described elastic body 106, in the case where the plastic sheet such as the above described polyethylene and the like is used, it is desirable that the plastic sheet having a thickness of about 0.1 to 0.5 mm is used. Further, as for the dimensions of the support body and the elastic body 105, 106, if a rectangle is cited as an example, it is desirable that the ratio of an axis of ordinate to the axis of abscissas is about 2 to 1.5 : 1. For example, by an absolute dimension of the axis of ordinate to the axis of abscissas, the ratio can be rendered as 40 mm : 25 mm, 35 mm : 20 mm, 30 mm : 11 mm and the like.

[0053] A radius of curvature in the case where the above described support body 105 and the elastic body 106 are curved is desirable to be 11 mm to 40 mm. In the case of a small curvature, a force to nip the passage body 101 of the support body 105 and the elastic body 106 is strong, and a reaction against to extracting a tubular body 131 is also good. On the contrary, a force to nip the passage body 101 of the support body 105 and the elastic body 106 and a force allowed at a time when they are pressurized and moved or when the bar-shaped body is inserted can be adjusted.

[0054] With respect to the material, it is desirable that any one from a bag body constituting an inflatable body 1, the passage body 101, the support body 105 and the elastic body 106, the plastic material constituting the lid body 108 and a sheet type uses a single material. For example, a plastic system or the material comprising the composite sheet of these materials and aluminum foil are confirmed to be extremely suitable for the solution of the above described problems of the invention with respect to versatility, workability as the material and processability after becoming refuse.

[0055] In Figures 9 to 12 is shown a state constituting the check valve 3 by clipping the passage body 101 by the support body 105 and the elastic body 106. That is, Figure 9 shows a state where the support body 105 and

the lid body 108 are opened, and Figure 10 shows a state where a longer sheet constituting the passage body 101 and the elastic body 106 along the retention guide 109 of the support body 105 is stored, and Figure 11 shows a state where the hook 114 is fit into the socket 115 of the support body 105 so as to nip both sides of the passage body 101. In Figure 11, which shows the completed state, the passage body 101 is pressed against the support body 105 together with the elastic body 106 by the ribs 113 of the lid body 108.

[0056] The check valve 3 assembled as described above, as shown in Figure 12 and Figure 13, is held in a circular shape with the passage body 101 being in a curved state followed by the curvature of the support body 105 and the elastic body 106 and, moreover, the lid body 108 is positioned on the chord. By so doing, the shape of the elastic body 106 can be held along the support body 105 by the lid body 108 and its curvature can be steadily held by the above described ribs 113 so that the passage body 101 can be strongly pressurized tightly.

[0057] The action of the check valve 3 constituted as described above will be described.

[0058] Figure 14 shows a state in which the tubular body 131 such as a straw and the like is inserted into the passage body 101. The check valve 3 loosens adhesion of the passage portion 102 adhered by the support body 105 and the elastic body 106 by inserting the tubular body 131 into the inside of the passage portion 102 of the passage body 101, thereby securing a passage. In the drawing, by using a straw and the like as such tubular body 131, an attempt is made to secure much reliable passage.

[0059] In Figure 15 which describes the above action more in detail, the top end of the tubular body 131 comprising a straw and the like is inserted from an upper end of the guide portion 104 of the passage body 101. Actually, by attaching an insertion guide on this portion, it can be made a shape where the tubular body 131 can be easily inserted. As shown in Figures (a) to (d), when the tubular body 131 is gradually pushed down, the passage portion 102 of the passage body 101 is enlarged together with the elastic body 106.

[0060] When the tubular body 131 is further pushed down, the elastic body 106 pressed to the support body 105 by the lid body 108 is enlarged in its whole length along the tubular body 131, and as shown by Figure (d), a gas can freely circulate therethrough. Accordingly, a filling operation using the tubular body 131 comprising a straw and the like can be simply performed.

[0061] On the contrary, in the case where the passage portion 102 of the passage body 101 is closed, the tubular body 131 may be simply extracted. That is, the elastic body gradually returns to its original position to adhere to the support body 105, and the passage portion 102 of the passage body 101 traces back from Figures (d) to (a) so that the whole length thereof automatically adheres once again. At this time, when a pressure

to push back the object from the reverse direction is applied on the check valve 3, the pressure is transmitted to the passage body 101 through the support body 105 and the elastic body 106 so that the passage portion 102 of the passage body 101 is sealed much more.

[0062] Although the above showed the case where the opening and closing of the passage portion 102 of the passage body 101 was performed by the tubular body 131 comprising a straw and the like, by opening one end of the passage body 101 and applying the pressure by resisting to resilience of the elastic body 106, the object can be pushed in by allowing it forcibly to pass through the passage portion 102.

[0063] Thus, since back-flow/leakage of air inside the air chambers can be prevented by the check valve 3, it is possible to maintain an inflated state for an extended period of time.

[0064] Note that, as the above described elastic body 106, the bar-shaped body, the elastic tube and the like which comprise elasticity can be used instead of sheets, and particularly as the elastic tube, a silicon tube can be suitably used.

[0065] When the inflatable type shock absorbing package body according to the invention as constituted above is used, as shown in Figure 16, first, in the normal state in which air is not filled into the air chamber, the opening portion 13 of the package body 1 is enlarged so as to become cylindrical, and the object 2 is inserted. When the object 2 is positioned nearly in the middle, air is filled from the check valve 3 so as to expand the air chamber.

[0066] On the contrary, when the object 2 is extracted, air is exhausted from the check valve 3 by the above described method so that the air chamber is shrunk, and the object 2 may be taken out.

[0067] As described above, the inflatable type shock absorbing package body according to the invention can be often repeatedly used by taking air in and out.

[0068] Further, as more practical use of the package body, as shown in Figure 17, a handle 14 is attached so as to use it as a bag (a) and, since there is basically no limit imposed on the dimension, it is suitable for carrying in and carrying out (b) continuous lengths by meeting the dimension of an object to be held there. In the case of (a), assuming that the air chamber is damaged by any chance so that air is leaked, it is desirable to arrange a safety catcher of the object at the bottom.

[0069] Note that, in the case where the sheets constituting the inner and outer walls are different like the above described structural example 1 of Figure 2 and the above described structural example 2 of Figure 3, by increasing a thickness of the sheet constituting the outer wall or by using the material having flexibility and yet much more toughness, that is, a mechanical strength, it is possible to prevent the leakage of air due to the damage. Here, the mechanical strength means all means necessary for evaluating a degree whereby it is hard for the flexible sheet to receive the damage due

to external factors such as tension, elasticity, shock-resisting, fracture and the like.

[0070] Figures 18 to 26 show a second embodiment of the inflatable type shock absorbing package body according to the invention. In the above described first embodiment, though a type in which a pair of air chambers are directly connected was shown, in the present embodiment, a type in which they are indirectly connected will be shown.

[0071] That is, in the above example, as shown in Figure 1, two air chambers are directly connected at both ends and, therefore, in the case where air is filled into the air chambers, though the central portion of the package body has a cross section almost inflated in a circular shape, the welded portion of the end portions intends to maintain a linearity so that a bent portion is produced. The bending depends also on the shape of the object to be stored, and the positions and the number of bending frequencies are all different, and the shapes of the end portions when the object is stored are definitely not beautiful.

[0072] Hence, as a result of experimental studies, the inventor has found that such a problem can be solved by separating the two air chambers spaced at predetermined intervals.

[0073] That is, as shown in Figures 18(b) and (c), connected end portions 15 of the two air chambers are separated through joint portions 16 so that the welded portion comes to display an almost good-looking rectangle, and it was also found that this is not affected by the magnitude and the dimension of the object to be stored.

[0074] In this way, not only the side face but also, as shown in the same drawing (a), the shape of the front became extremely good-looking, and it became most suitable for displaying commercial goods. Further, if the handle 14 is attached thereto, it can be made a commercial package having an extremely high display property.

[0075] In Figures 19 to 26 are shown these structural examples.

[0076] Figure 19 is a first structural example and shows a case where three pieces of the flexible sheets are used.

[0077] First, three pieces of the flexible sheets totaling one piece of the sheet 7 constituting a twice-folded inner wall and two pieces of flat plate-like sheets 8A, 8B are prepared (a).

[0078] The dimension of the sheet is such that the width of the sheet 7 which is twice-folded is smaller than the widths of other sheets 8A, 8B. This is because, when the three sheets are superposed with the periphery thereof welded, the folded portion 9 of the sheet 7 is not allowed to be welded so that the portion is made a communication portion of the air chamber.

[0079] The three sheets adjusted to such a dimension are superposed as shown in the same drawing (b) and welded along the peripheries of the sheets 8, and desired positions are welded from upper and lower ends

across almost all the width (arrow mark portions). At this time, the check valve 3 is provided between the sheets 7 and 8. More practically when welding, the sheet 7 has all the end portions welded together with the sheets 8, except for the twice-folded portion. On the upper and lower desired positions, welded lines 17A and 18B are provided. The welded line 17A extends across all the width, while 17B leaves the communication portion 18, which communicates the two air chambers. In this case, as shown in the same drawing (c), when the welded portion is made a L-letter shape, the communication portion 18 only is formed, and when air is filled, as shown in the same drawing 18(b), though the joint portion 16 of the bottom remains flat, as shown in the same drawing 19 (d), when it is welded in an open state, as shown in the same drawing 18(c), another air chamber can be provided at the bottom.

[0080] Note that (e) is a sectional view, which is in a state of having crushed a cylindrical body.

[0081] Note that the material of the flexible sheet can be selected from a plastic sheet, a metallic sheet or a composite sheet made of these sheets as components. As for an example of the plastic sheet, polyethylene, polypropylene, polyester, polycarbonate, nylon resin and the like can be cited. These flexible sheets or composite sheets are taken as materials, and two pieces of the material sheets are bonded together and the periphery thereof is heat-sealed at a predetermined width, so that the sheets are heat-welded and formed. Alternatively, for example, the material in which the outside layer is polyethylene or polypropylene, and the inner layer is nylon resin or polyester may be taken as the material.

[0082] Note that the check valve 3 may be, of course, arranged in the way as shown in Figure 20.

[0083] Figure 21 shows a second structural example and shows a case where two pieces of the flexible sheets are mutually twice-folded and used.

[0084] First, the sheet 7 constituting the inner wall and the sheet 8 constituting the outer wall are prepared (a). With respect to each width size (A), (B), the width in the sheet 8 is larger than that in the sheet 7. This is because of the same reason as that of the structural example shown in the previous drawing.

[0085] Each sheet is twice-folded, and each sheet is directed to the same direction, and the sheet 7 is inserted into the twice-folded sheet 8 (b). Further, the check valve 3 is inserted and welded along the periphery of the sheet 8, and the welded lines are provided at desired positions from the upper and lower ends (c). In this case, the welded line 17A extends across all the width, while 17B leaves the communication portion 18, which communicates the two air chambers. In this case, as shown in the same drawing (d), when the welded portion is made a L-character shape, the communication portion 18 only is formed, and when air is filled, as shown in Figure 18(b), though the joint portion 16 of the bottom remains flat, as shown in Figure 21(e), when it is welded in an open state, as shown in Figure 18(c), another air

chamber can be provided at the bottom.

[0086] (f) is a longitudinal sectional view, which is in a state of having crushed a cylindrical body.

[0087] Figure 22 is a third structural example and shows a case where a cylindrical sheet is used.

[0088] First, a cylindrical flexible sheet like (a) is prepared, and four pieces of the welded lines are provided at desired positions. The check valve 3 is inserted into the end portions of 1, and the two end portions are welded.

[0089] In this case, the welded lines 17 are all formed by leaving the communication portion 18 which communicates the air chambers. However, as for 17B, as shown in the same drawing (d), when the welded portion is made a L-character shape, the communication portion 18 only is formed, and when air is filled, as shown in Figure 18(b), though the joint portion 16 of the bottom remains flat, as shown in Figure 21(e), when it is welded in an open state, as shown in Figure 18(c), another air chamber can be provided at the bottom.

[0090] In the present case, since 17A is also provided with the communication portion, in Figure 18 (c), a small air chamber is also produced at the upper joint portion 16.

[0091] (f) is a longitudinal sectional view, which is in a state of having crushed a cylindrical body.

[0092] This is the most simplest constitution. Since an inner sheet adheres to an outer sheet at the folded portion, the communication of air of the air chamber is not sufficient, and even if air is filled, the air chamber only, in which the check valve 3 is located, has a strong tendency to expand.

[0093] Figure 23 is a fourth structural example and shows a case where the package body is constituted by one only sheet.

[0094] As shown in the same drawing (a), one piece of the flexible sheet provided with the portion 7 constituting the inner wall and the portion 8 constituting the outer wall is prepared. The reason why the width of the two portions is different is because, in the case where the flexible sheet as the material is a material laminated by polyethylene resin (PE) and nylon resin (NY), polyethylene is allowed to be mutually welded. That is, in the drawing, the sheet is folded in such a manner that the outer side is nylon resin and the inner side is polyethylene resin. Note that, in the case of the single material sheet comprising polyethylene only and the composite material such as PE-NY-PE, since the nylon resin which is unable to be welded does not contact with each other, the two portions may have the same width. This is common to all the embodiments of the invention.

[0095] Subsequently, as shown in (b), the sheet is twice-folded by clipping the check valve 3, and is welded along the end portions, and at the same time, the welded line 17B is formed. Further, the sheet is twice-folded as shown in (c) and (d) and the end portions 12 are welded.

[0096] When the welded line 17A has the welded portion formed in like a open-box shape, the communica-

tion portion 18 only is formed, and when air is filled, as shown in Figure 18 (b), though the joint portion 16 of the bottom remains flat, as shown in Figure 23(c), when it is welded in an open state, as shown in Figure 18(c), another air chamber can be provided at the bottom.

[0097] The same Figure 23(d) is a front view in the normal state, which is in a state of having crushed a cylindrical body.

[0098] Figure 24 is a refraction preventive member of the air chamber communication portion 18.

[0099] By the methods shown in Figure 4, Figure 5, Figure 22 and Figure 23, as shown in Figure 24 (d), the sheet 7 constituting the inner wall and the sheet 8 constituting the outer wall adhere on a refracted portion so that the communication of the air chambers 4, 5 is not secured and air flowing from the check valve 3 does not pass through the communication portion 18. Hence, the air chamber 4 only, in which the check valve 3 is located, expands and the two air chambers are not allowed to expand in a balanced manner and, therefore, there arises an adverse effect of the position of the object to be stored being not established.

[0100] Accordingly, by inserting an adherence preventive member 19 formed by an elastic body into the communication portion 18, as shown in Figure 24(e), the communication portion 18 is secured so that the air chamber can be almost uniformly inflated.

[0101] Note that, though the adherence preventive member is in a shape as if it has longitudinal ribs formed on a flat member, if it has a shape whereby adequate flexibility and elasticity is provided so that a passage can be secured, the shape may be not as shown, but cylindrical.

[0102] Figure 25 is a fifth structural example, which is an improved type of the above described air chamber communication method.

[0103] As shown in the drawing, by using two pieces of the flexible sheets 11 having somewhat different widths or one piece of the flexible sheet 11 made different in a width size at the center, a two-ply bag body is formed. Distinguishing between uses of these material sheets is due to difference in laminated structure of the composite sheets.

[0104] That is, for example, in case of using the laminated sheets of PE-NY, both surfaces of PE are superposed so as to be joined by all means, and welded. At this time, for the purpose of the process (d) where both end portions 22 are welded, the width sizes of two pieces of the sheets to be superposed are adjusted so that the PE surface of the sheet which becomes below is exposed by all means. There is no need to do so in the case of the PE-NY-PE laminated sheet.

[0105] First, by superposing two pieces of the flexible sheets 11 or twice-folding one piece of the flexible sheet 11, the periphery thereof is welded seamlessly further except for a check valve 3 attached portion 20 of one side. At this time, in the drawing, welded lines 21 of the height direction are to be positioned further inside a con-

stant dimension than the left and right ends 22. That dimension is half a dimension of the interval between central broken welded lines 23 ($d = D/2$). In this way, since the air chambers are formed with only one opening portion, the leakage can be prevented. Further, by providing two pieces of the welded lines 23 in parallel by clipping the check valve attached portion 20, three pieces of the air chambers (24A, 24B, 24C) are provided. The welded lines 23 are broken lines, and three air chambers are communicated at portions not welded.

[0106] After having finished welding for the purpose of forming the three air chambers, the check valve 3 is inserted into the opening 20 clipped by the broken welded lines 23, and is weld-fixed.

[0107] Then, as shown in (d), the flexible sheet 11 is twice-folded so as to join the left and right ends 22 to be welded.

[0108] Note that, in the case where, for example, as the material sheet, one piece of the sheet (such as a rollback sheet) which continues in the width direction in the drawing (b) is folded and used, the folded position should be almost at the center of the width direction (the height direction of the drawing (b)) of the sheet, and the widths of the upper and lower sheets after folding are made different, and the sheets are cut off at the folded line. Further, the centers in the width direction of both sheets are aligned, and, then, the process advances to step (c).

[0109] On the occasion of using the inflatable type shock absorbing package body constituted in this way, when air is injected from the check valve 3 as shown in Figure 26 (a), the air chamber 24B at the center is first inflated and, then, air inflows from the interval between the broken welded lines 23 to the air chambers 24A, 24C and, therefore, as shown in the same drawing (b), air flows into both air chambers equally. Accordingly, the contents 2 is easy to fall into place at a central portion of the package body.

[0110] Figure 27 further shows the sixth structure example.

[0111] In the drawing, two pieces of the flexible sheets are prepared, and an inner wall sheet 6 is inserted into an outer wall sheet 7 and superposed, and the two pieces of the broken welded lines 23 in parallel at opposed positions spaced at desired intervals are provided in total of four pieces. In this way, the peripheral direction thereof is divided in four sections. On the end portion of a narrow portion clipped by the broken welded lines 23, the check valve 3 is clipped by the inner and outer sheets 6, 7, and both ends of the cylindrical sheets are welded to complete the package body.

[0112] Constituted in this way, as shown in Figure 28, the inflatable type shock absorbing package body is constituted by the air chambers which are communicated all in all.

[0113] Note that, when being constituted as shown above, there is no reason why the sheets cut in advance to quadrangle or the flexible sheets formed already in

the cylindrical shape should be used by all means. If a package body finally comes to have the same construction as that of the invention according to the claims by using continuous sheets on production and by means of welding and cutting processes conveniently arranged, there is no limit imposed on the forming method and the construction, and all the technologies which those skilled in the art can image can be applied as replacement.

[0114] Note that the inflatable type shock absorbing package body may have, of course, the air chambers filled with not only air but also various types of gasses.

Industrial Applicability

[0115] According to the invention, it became possible to provide an inflatable body, wherein, by using the high performance automatic closedown check valve, the goods to be transported is steadily held at a predetermined position and yet not only no shock nor any vibration is given to the goods to be transported, but also an appropriate use thereof is made regardless of the shape of the goods to be transported.

[0116] Further, the inflatable body according to the invention can be simply folded and stored in a compact form after use, and yet can be used repeatedly time after time by taking air and other fluid in and out, and, therefore, it became also possible to serve for the protection of valuable resources. When being repeatedly used, since the automatic closedown check valve has a sufficiently sustainable durability, a performance as a shock absorbing material has come to be maintained for an extended period of time.

Brief Description of the Drawings

[0117] Figure 1 is a front view (a) and a bottom view (b) of an inflatable type shock absorbing package body according to the invention. Figures 2 (a) to (e) are schematic diagrams showing structural examples of the inflatable shock absorbing package body according to the invention. Figures 3 (a) to (e) are schematic diagrams showing structural examples of the inflatable shock absorbing package body according to the invention.

Figures 4 (a) to (e) are schematic diagrams showing structural examples of the inflatable shock absorbing package body according to the invention. Figures 5 (a) to (e) are schematic diagrams showing structural examples of the inflatable shock absorbing package body according to the invention. Figures 6 (a), (b) and (c), (d) are perspective views and plane views showing the constitution of the essential part of the check valve, respectively. Figures 7 (a) to (d) are conceptual illustrations showing heat-welding examples of a passage body. Figures 8 (a) to (c) are perspective views showing the structural example of a lid body. Figure 9 is an assembly drawing showing an assembly state of a check valve. Figure 10 is a perspective view showing the assembled

state of the check valve. Figure 11 is a perspective view showing the assembled state of the check valve. Figure 12 is a plane view thereof. Figure 13 is a sectional view thereof. Figure 14 is a sectional view of the state in which a straw is inserted.

Figures 15 (a) to (d) are longitudinal sectional views showing the action of the check valve. Figure 16 is a conceptual illustration showing a using method of the inflatable type shock absorbing package body according to the invention. Figure 17 is a conceptual illustration showing a using example of the inflatable type shock absorbing package body according to the invention. Figures 18 (a) to (c) are a front view and side views showing a second embodiment of the inflatable type shock absorbing package body according to the invention. Figures 19 (a) to (e) are schematic diagrams showing the structural examples thereof. Figures 20 (a) and (b) are front views showing an arrangement example of the check valve. Figures 21 (a) to (f) are schematic diagrams showing other structural examples.

Figures 22 (a) to (f) are schematic diagrams showing other structural examples.

Figures 23 (a) to (e) are schematic diagrams showing other structural examples. Figure 24 is a schematic diagram showing an air chamber communication portion refraction preventive member and its using example.

Figures 25 (a) to (e) are schematic diagrams showing other structural examples. Figures 26 (a) and (b) are schematic diagrams showing its used state. Figures 27 (a) to (c) are schematic diagrams showing other structural examples. Figure 28 is a schematic diagram showing its used state.

Claims

1. An inflatable type shock absorbing package body, an air bag comprising at least one pair of opposed air chambers comprising flexible sheets provided with an automatic closedown check valve, wherein both side of a passage body comprising a flexible sheet and capable of opening and closing is clipped by a support body in a state of being refracted at a predetermined curvature and an elastic material adherable thereto, or further the passage body and the elastic material are clipped by the support body and the lid body refracted at a predetermined curvature and connected by connecting means, and the lid body is pressed along the support body in a state of being refracted at a predetermined curvature so that the passage body is closed in a normal state, and when a bar-shaped body is inserted into the inside of the passage body between the support body and the elastic material, the elastic material is deformed and the passage body is opened, and when the bar-shaped body is extracted, the elastic material adheres to the support body due to resilience so as to close the passage body, and separated

wherein, after an object has been stored in a space clipped by the opposed air chambers, air is filled into the air chambers so that, by expansion of the opposed two air chambers, the object is pressed and held.

2. The inflatable type shock absorbing package body according to claim 1, wherein one pair of opposed air chambers are formed by clipping one piece of twice-folded flexible sheet by two pieces of the twice-folded flexible sheet with the periphery thereof welded.
3. The inflatable type shock absorbing package body according to claim 1, wherein one pair of opposed air chambers are formed by clipping one piece of the twice-folded flexible sheet by another one piece of twice-folded flexible sheet and welding the periphery thereof.
4. The inflatable type shock absorbing package body according to claim 1, wherein one pair of opposed air chambers are formed by twice-folding one piece of a cylindrical flexible sheet and welding the end portions thereof.
5. The inflatable type shock absorbing package body according to claim 1, wherein one pair of opposed air chambers are formed by twice-folding one piece of the flexible sheet and welding the periphery thereof, and further by twice-folding it and welding a superposed portion of the end portions thereof.
6. The inflatable type shock absorbing package body according to any one of claims 1 to 5, wherein one pair of opposed air chambers are comprised by communicating through an air passage.
7. The inflatable type shock absorbing package body according to any one of claims 1 to 6, wherein one pair of opposed air chambers are comprised by being separated at a desired interval.
8. The inflatable type shock absorbing package body according to any one of claims 1 to 7, wherein one pair of opposed air chambers are comprised by being separated at a desired interval further through a small air chamber.
9. The inflatable type shock absorbing package body according to any one of claims 6 to 8, wherein an air passage refraction preventive member is inserted into the inside of the air passage.
10. The inflatable type shock absorbing package body according to claim 8, wherein the small air chamber communicating one pair of opposed air chambers is comprised by being divided by continuous welded

lines in the form of a broken line by a plurality of air passages in tandem in the longitudinal direction of the package body.

11. The inflatable type shock absorbing package body according to any one of claims 1 to 10, wherein, among the flexible sheets constituting the inflatable type shock absorbing package body, the sheet at the side which becomes the outer skin of the flexible sheet is thicker than the sheet at the side which becomes the inner skin.

12. The inflatable type shock absorbing package body according to any one of claims 1 to 11, wherein, among the flexible sheets constituting the inflatable type shock absorbing package body, the sheet at the side which becomes the outer skin of the flexible sheet is higher in mechanical strength than the sheet at the side which becomes the inner skin.

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Fig. 1

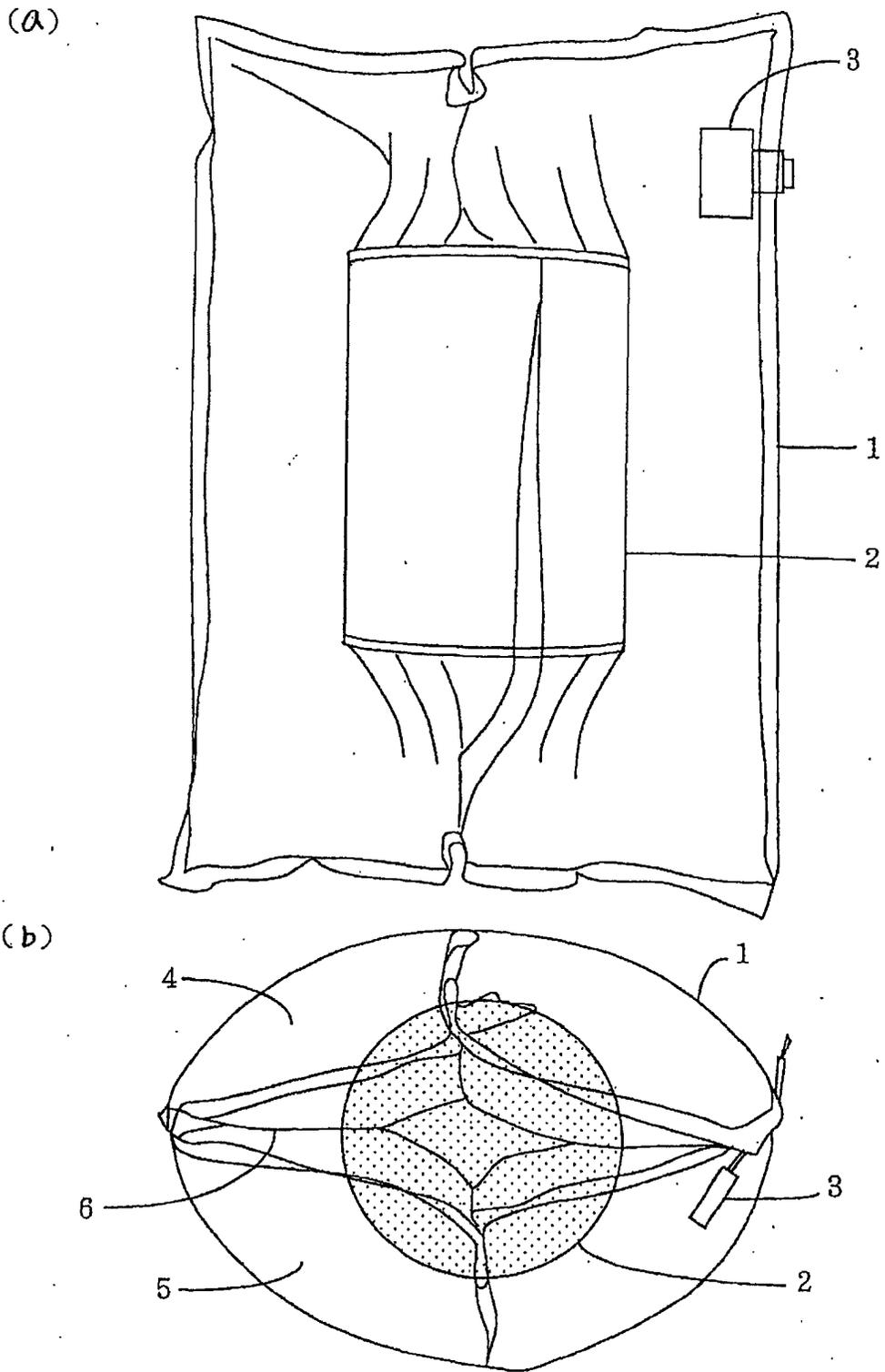


Fig.2

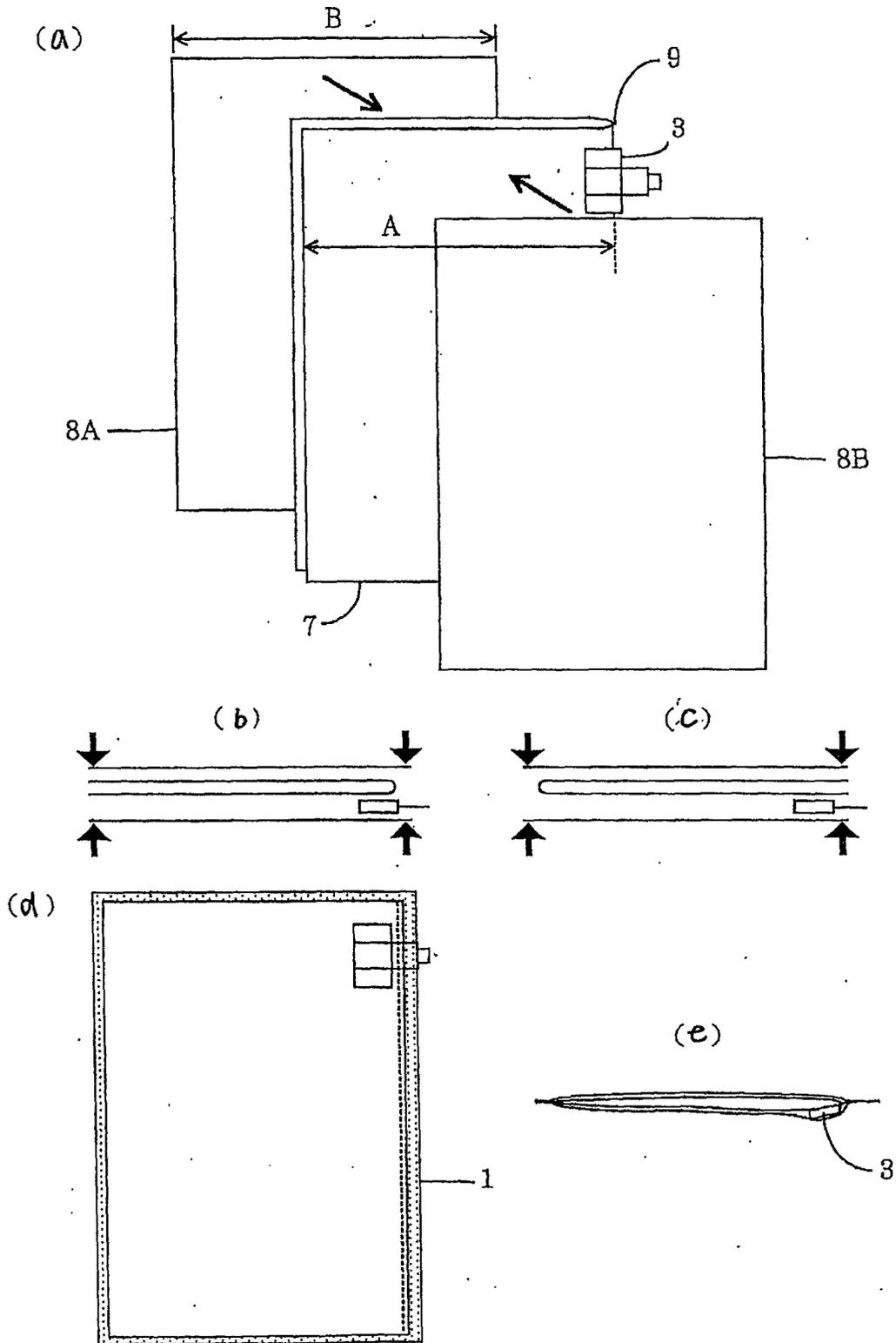


Fig.3

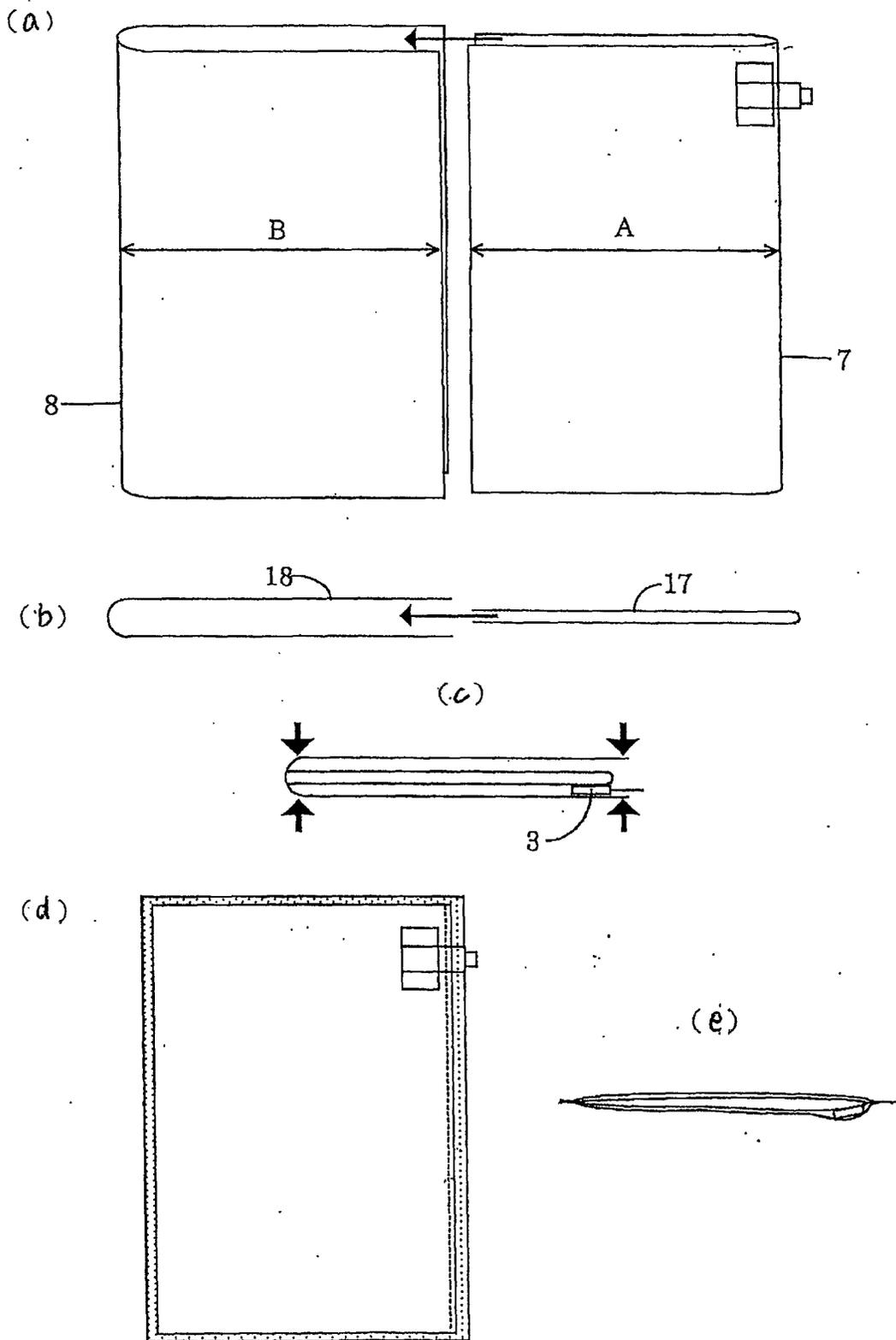


Fig.4

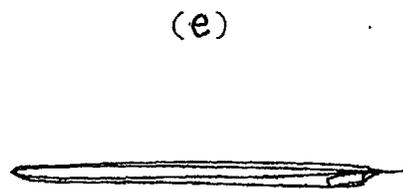
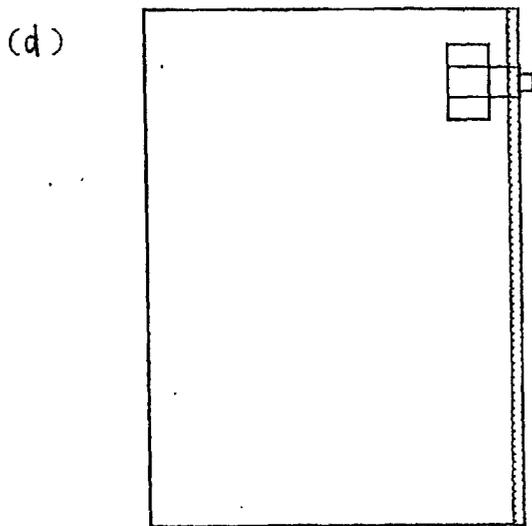
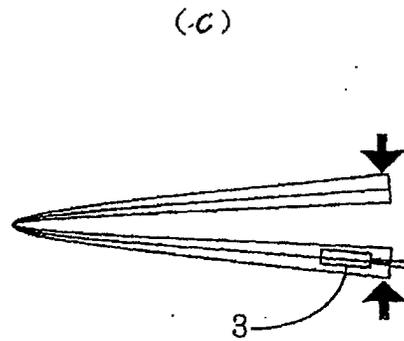
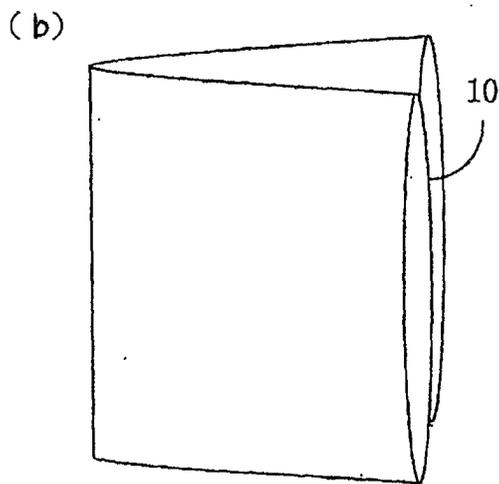
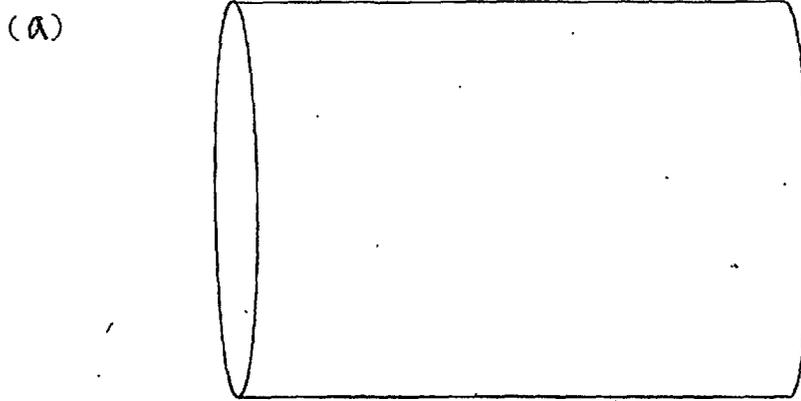


Fig. 5

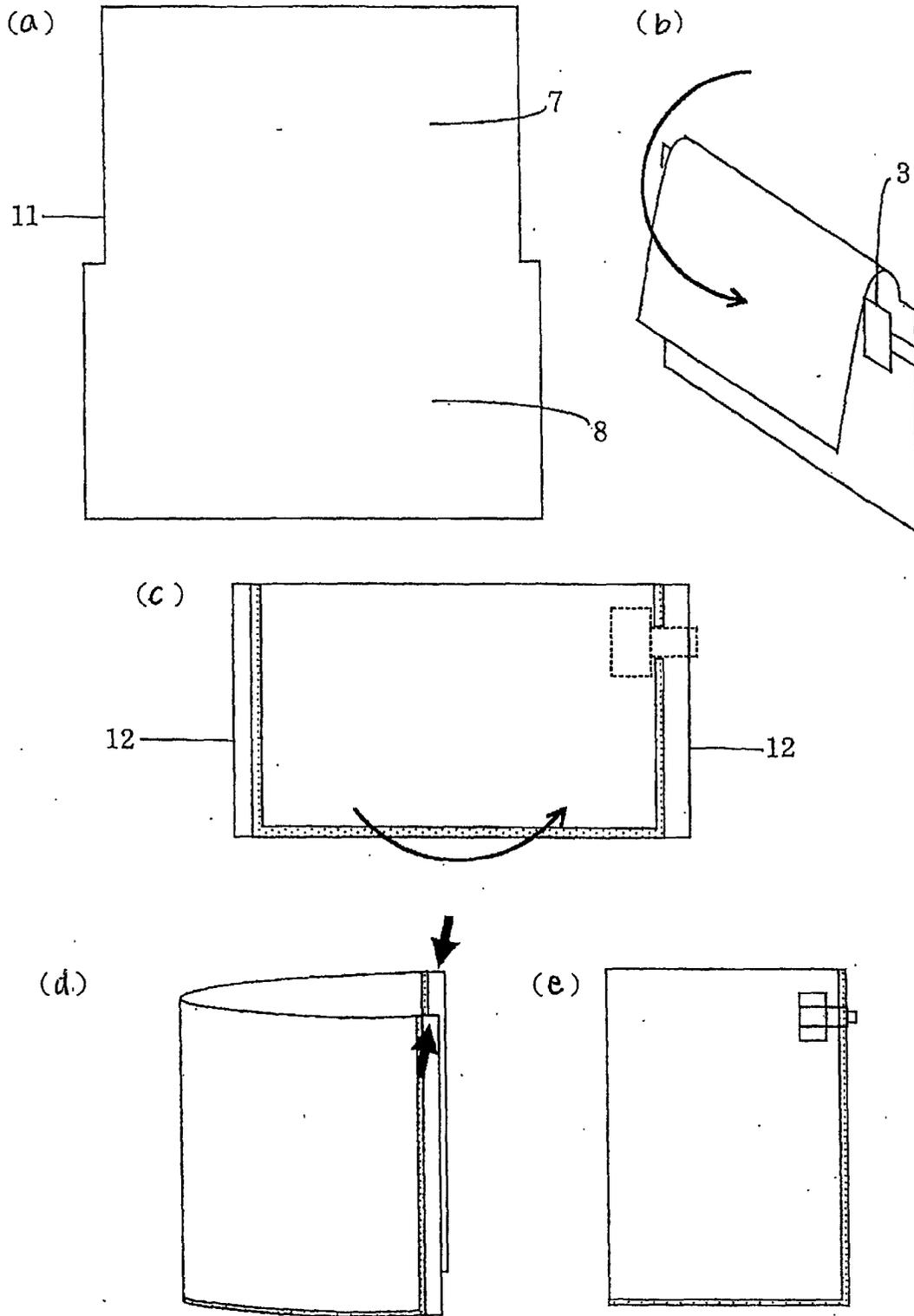


Fig. 6

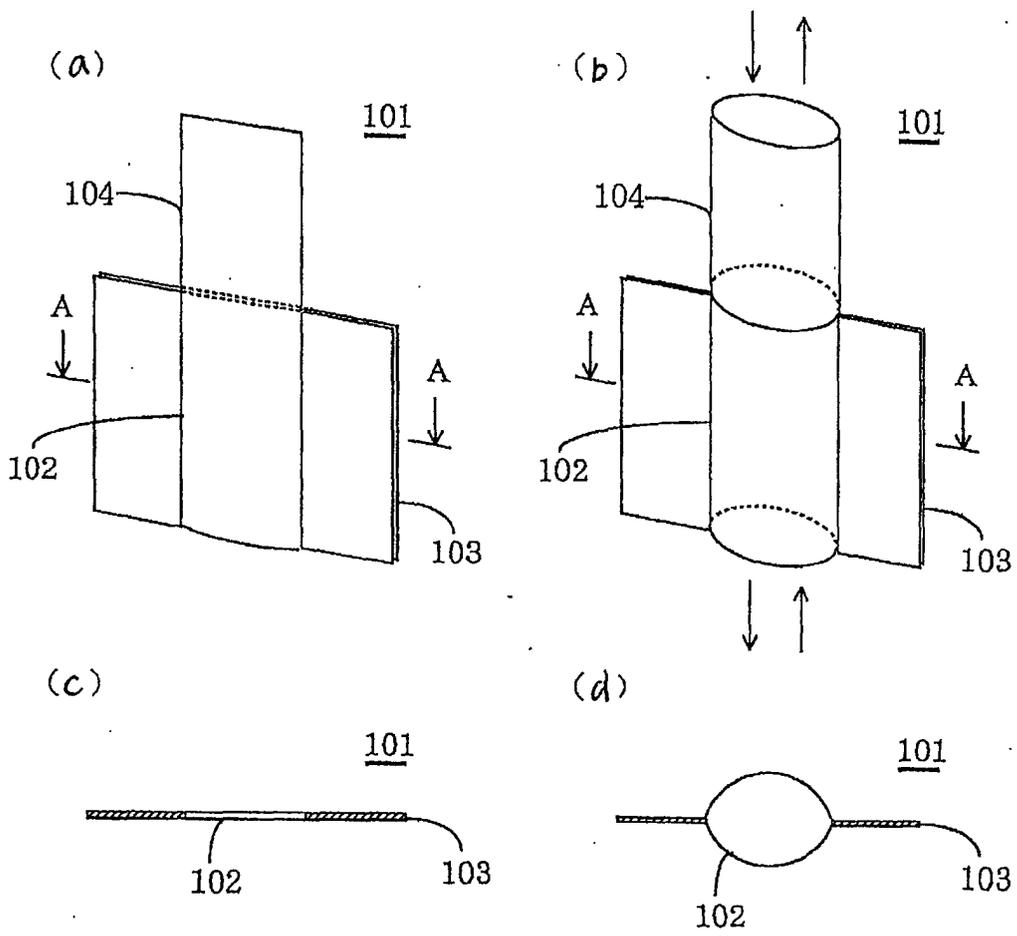


Fig. 7

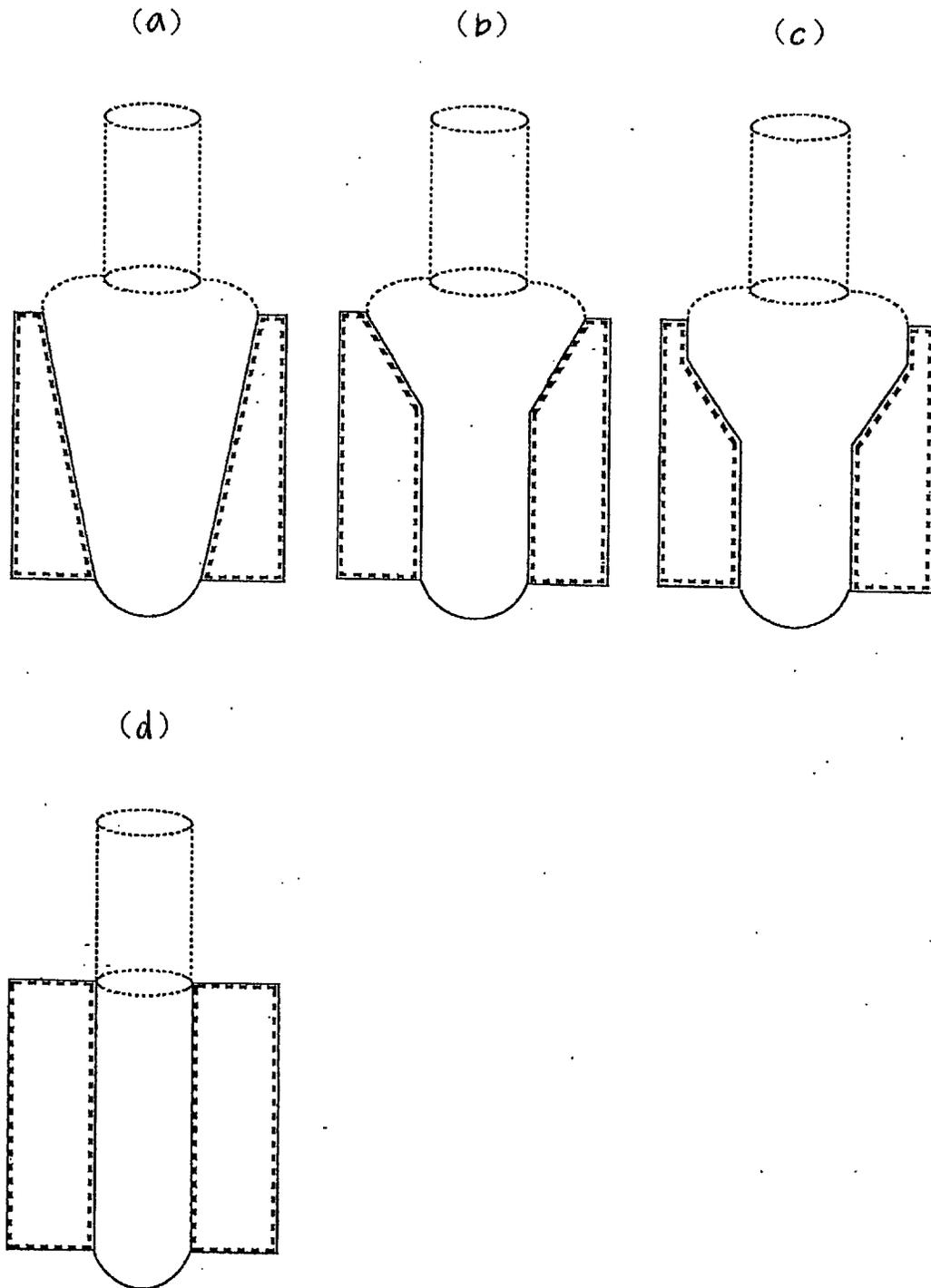


Fig.8

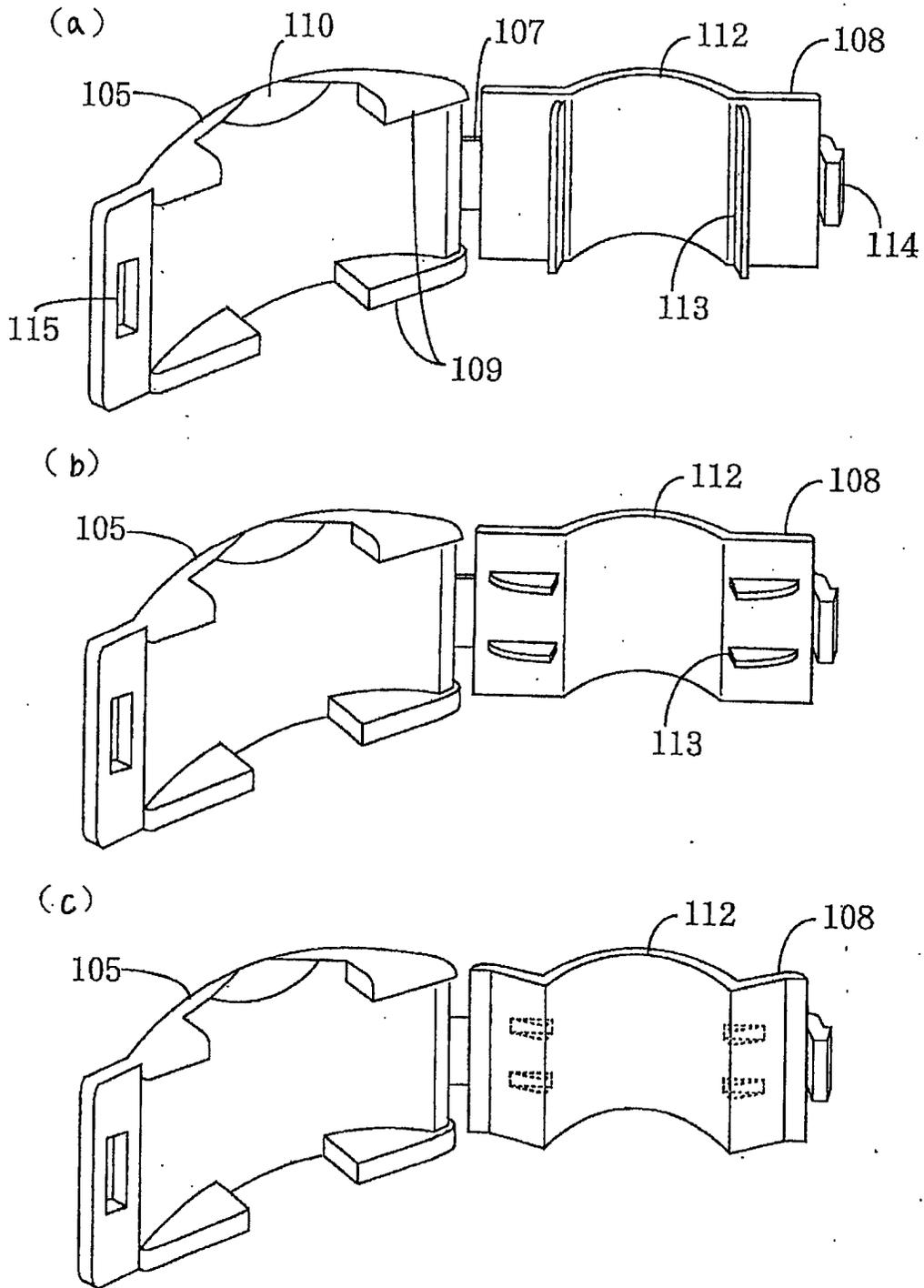


Fig. 9

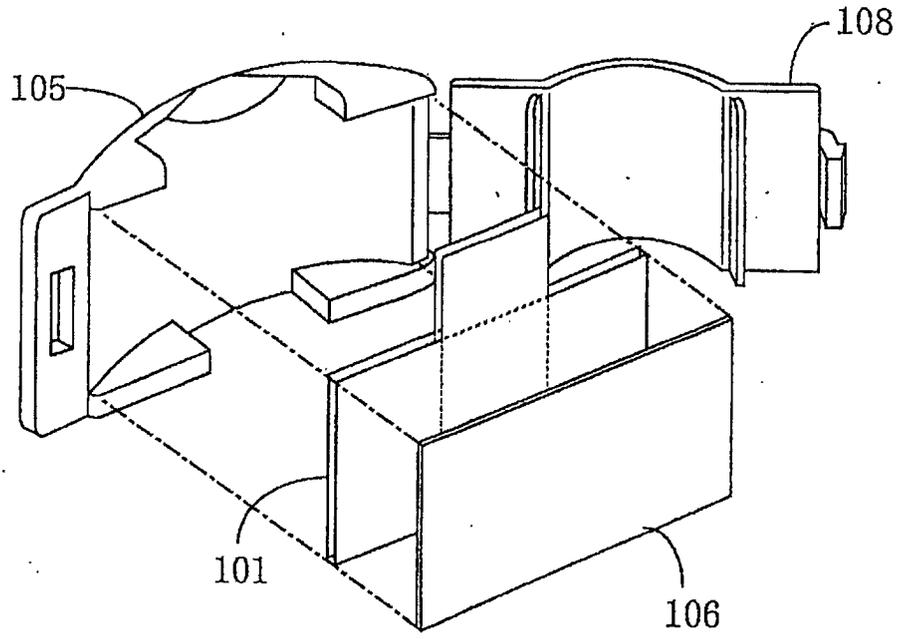


Fig. 10

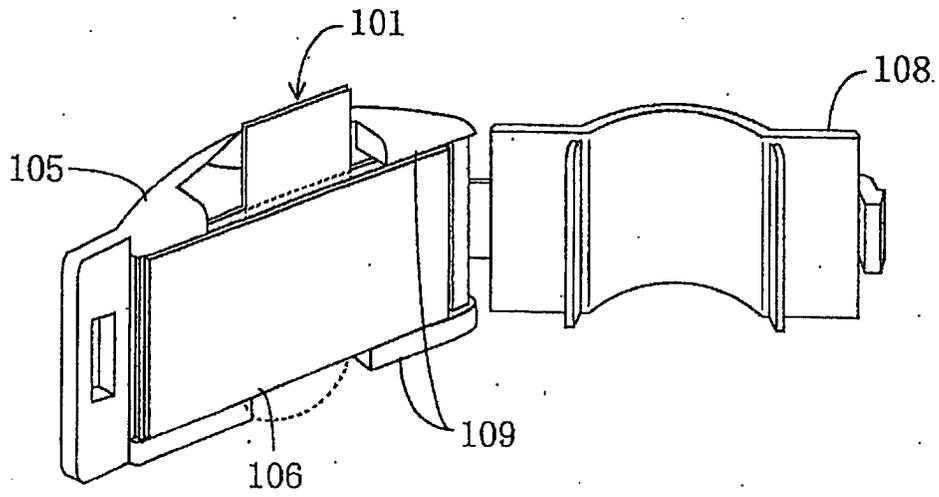


Fig. 11

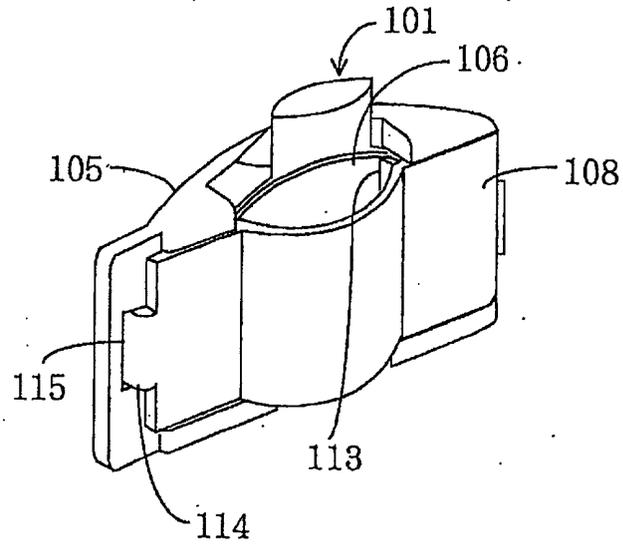


Fig. 12.

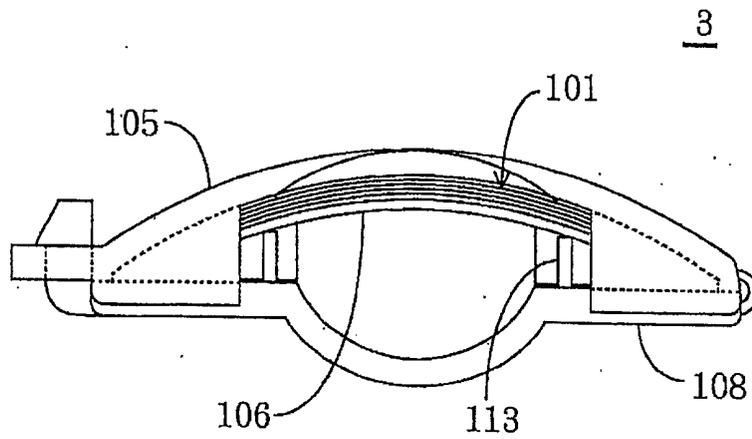


Fig. 13

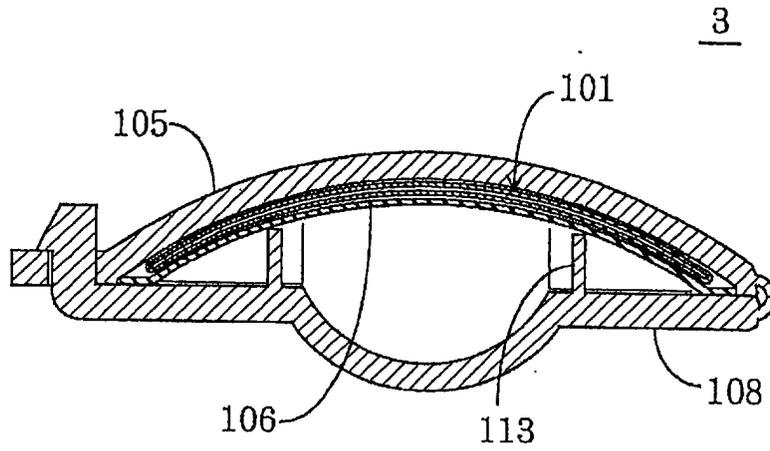


Fig. 14

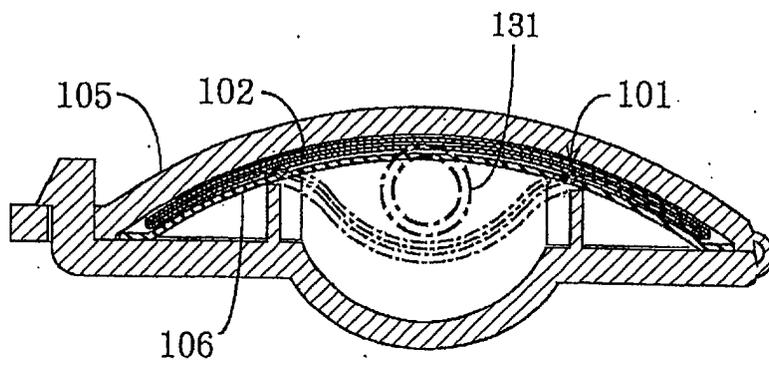


Fig.15

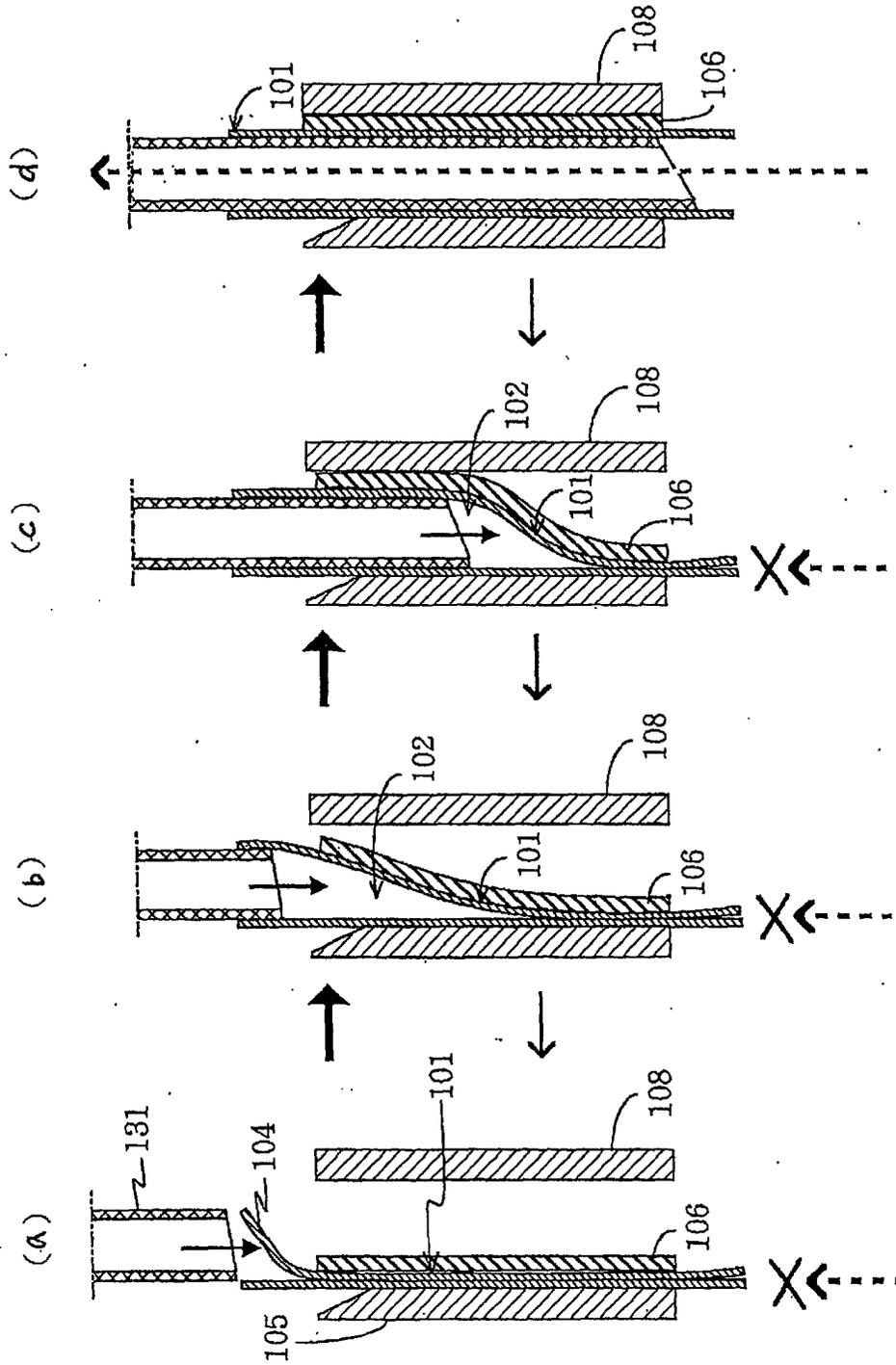


Fig. 16

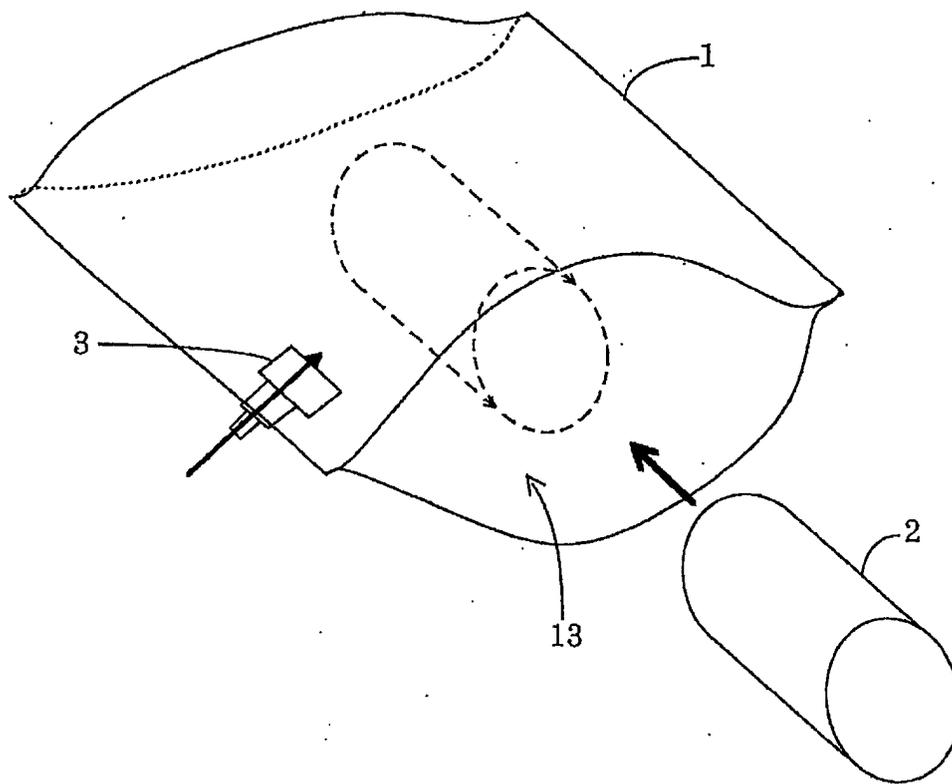


Fig. 17

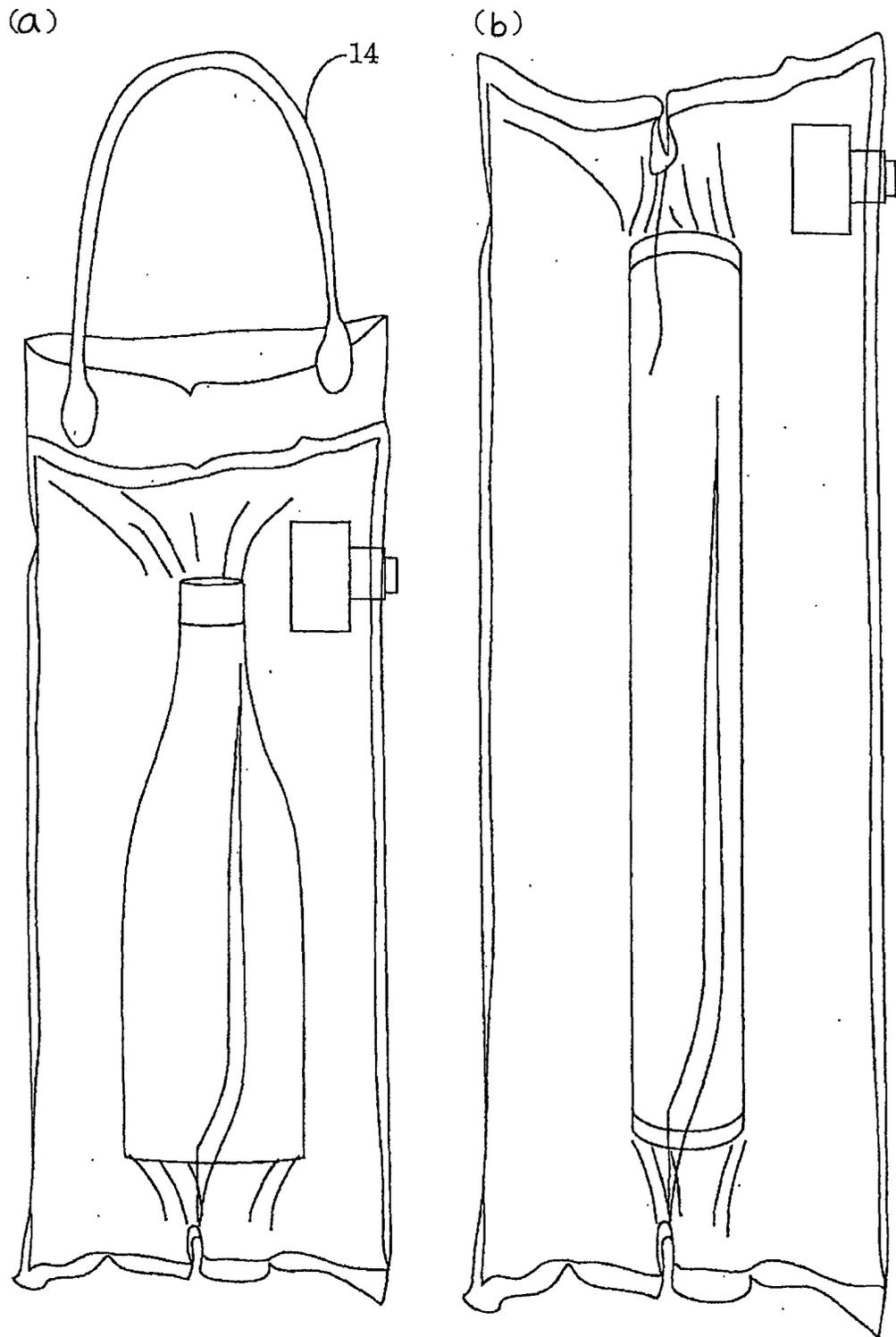


Fig. 18

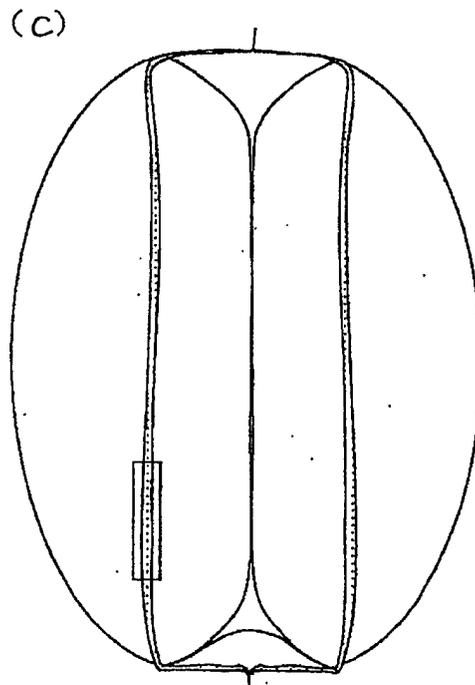
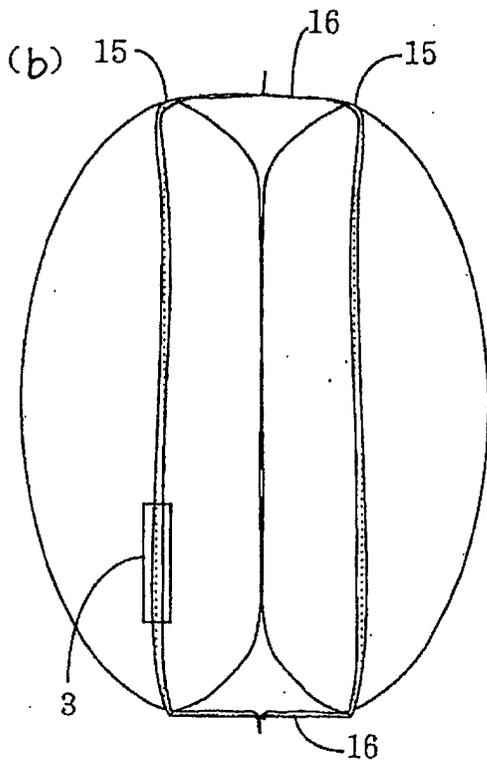
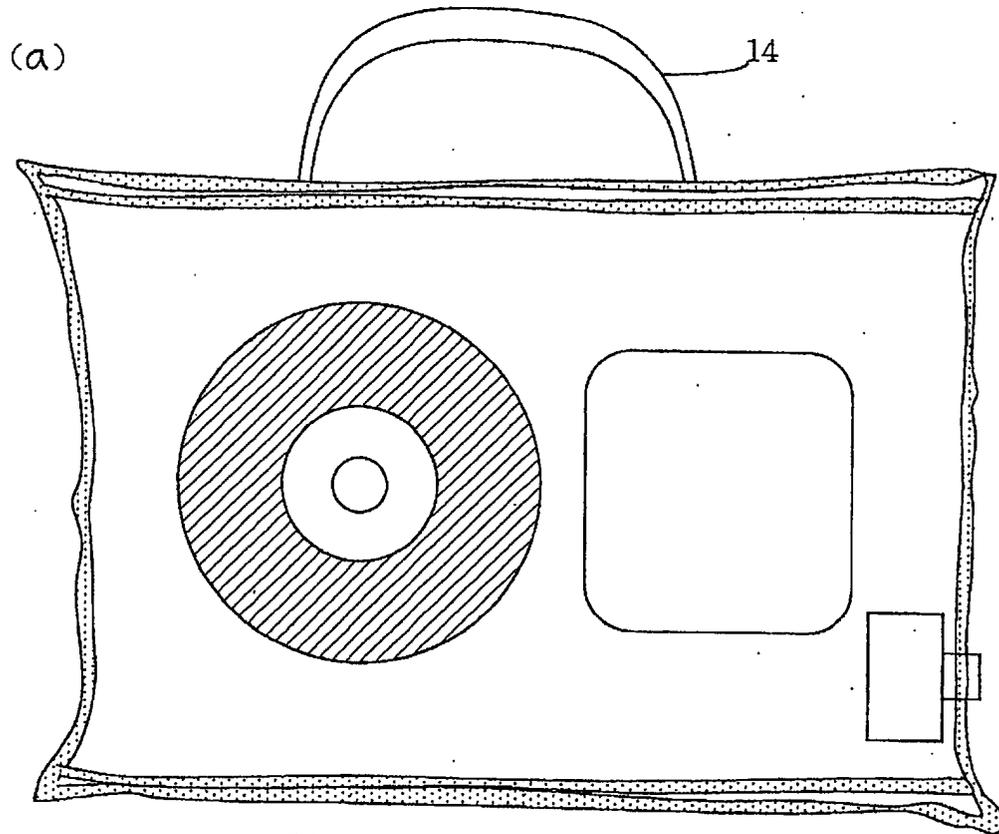


Fig. 19

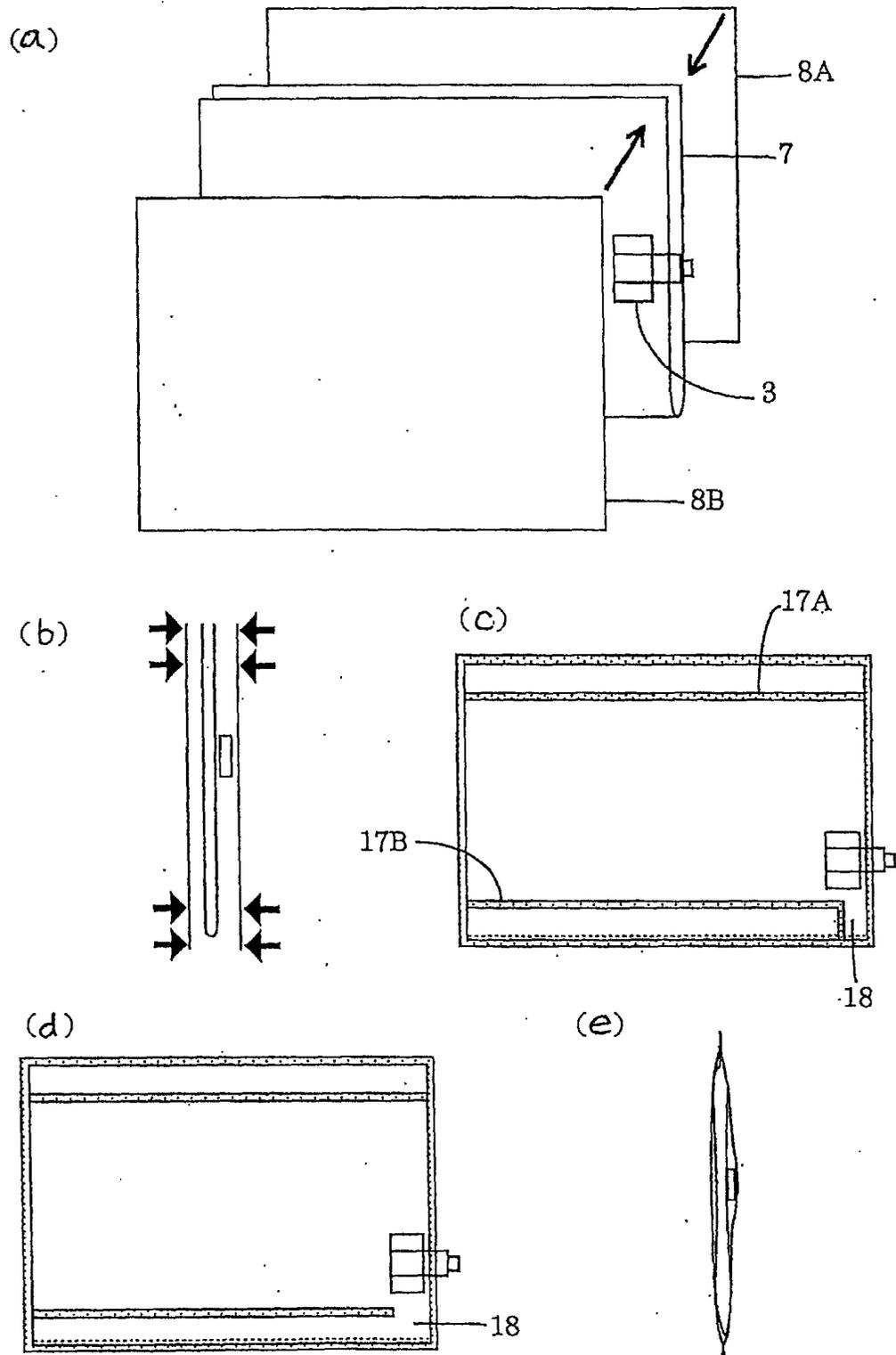


Fig. 20

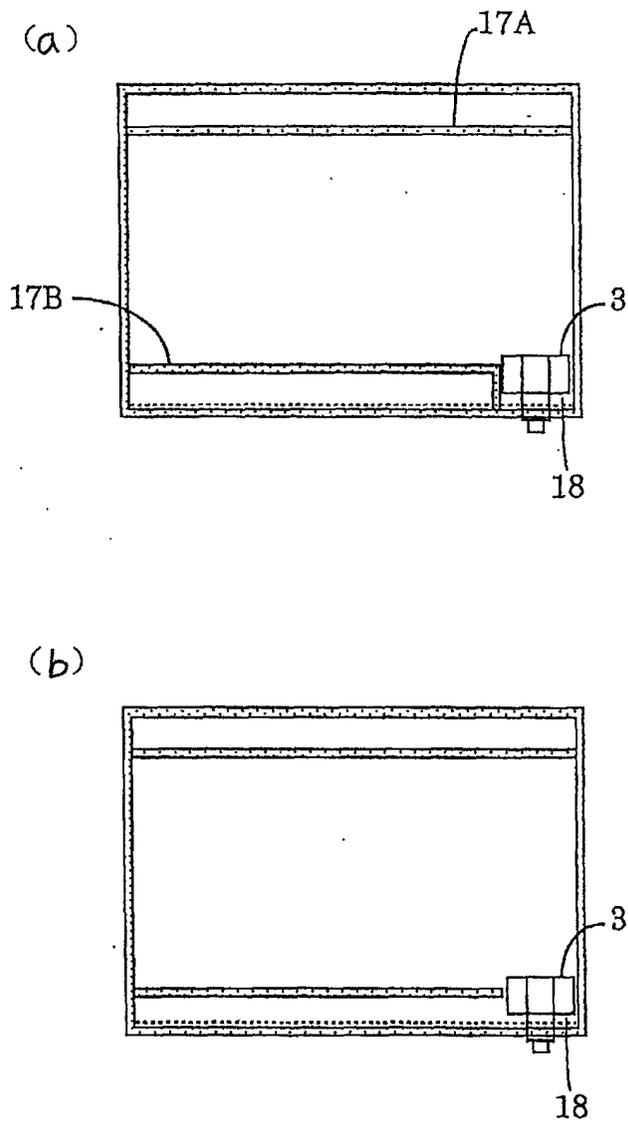


Fig.21

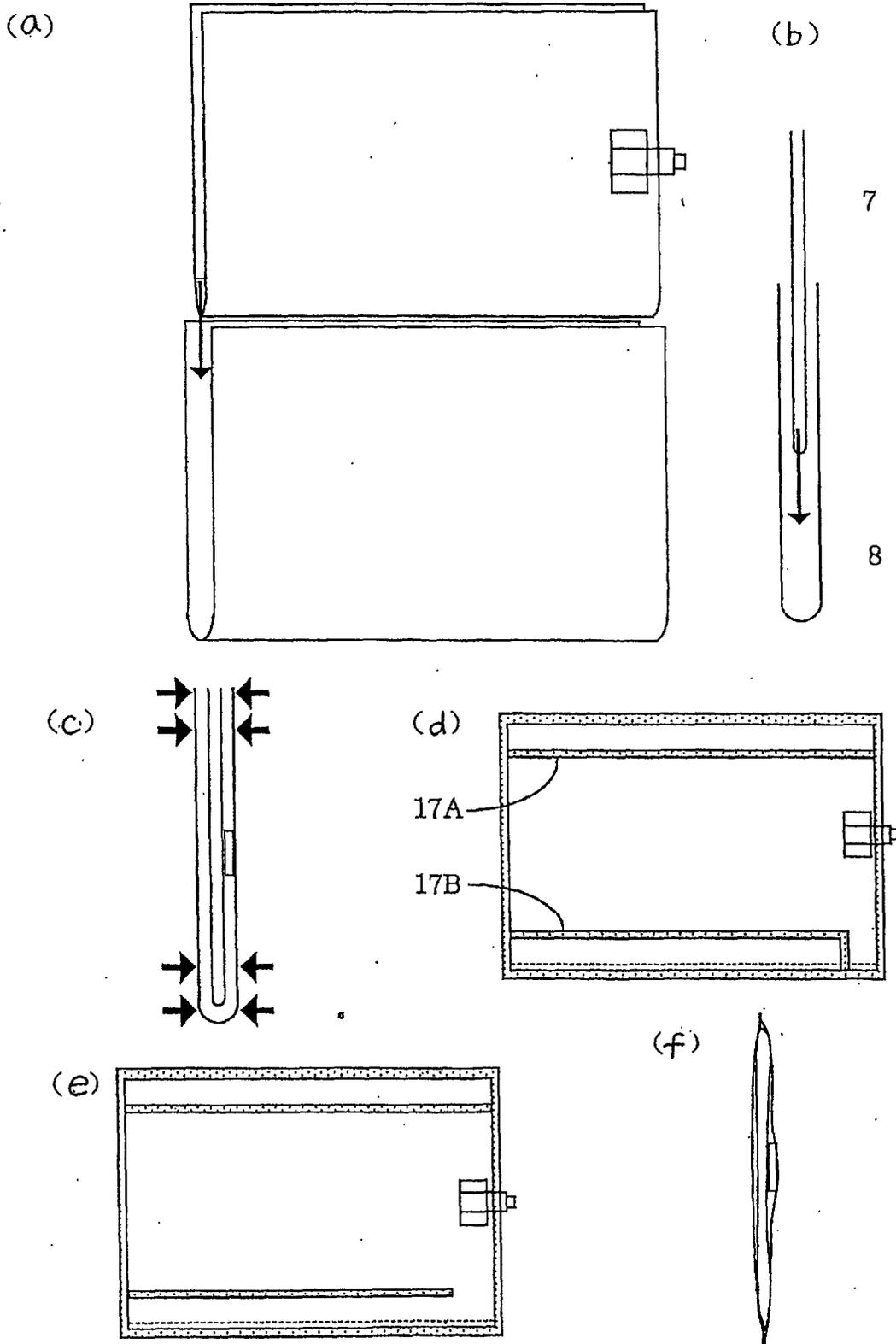


Fig.22

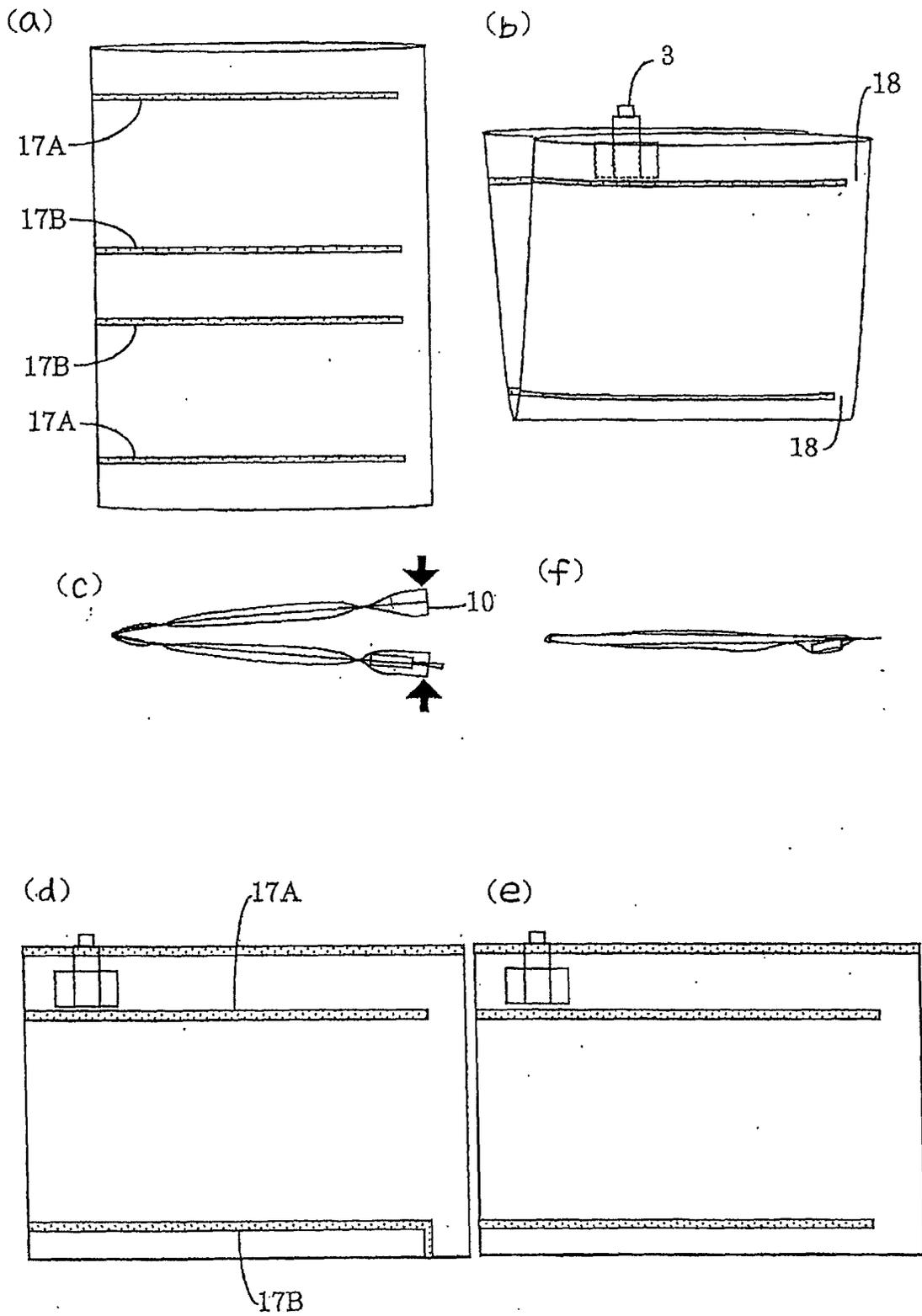


Fig. 23

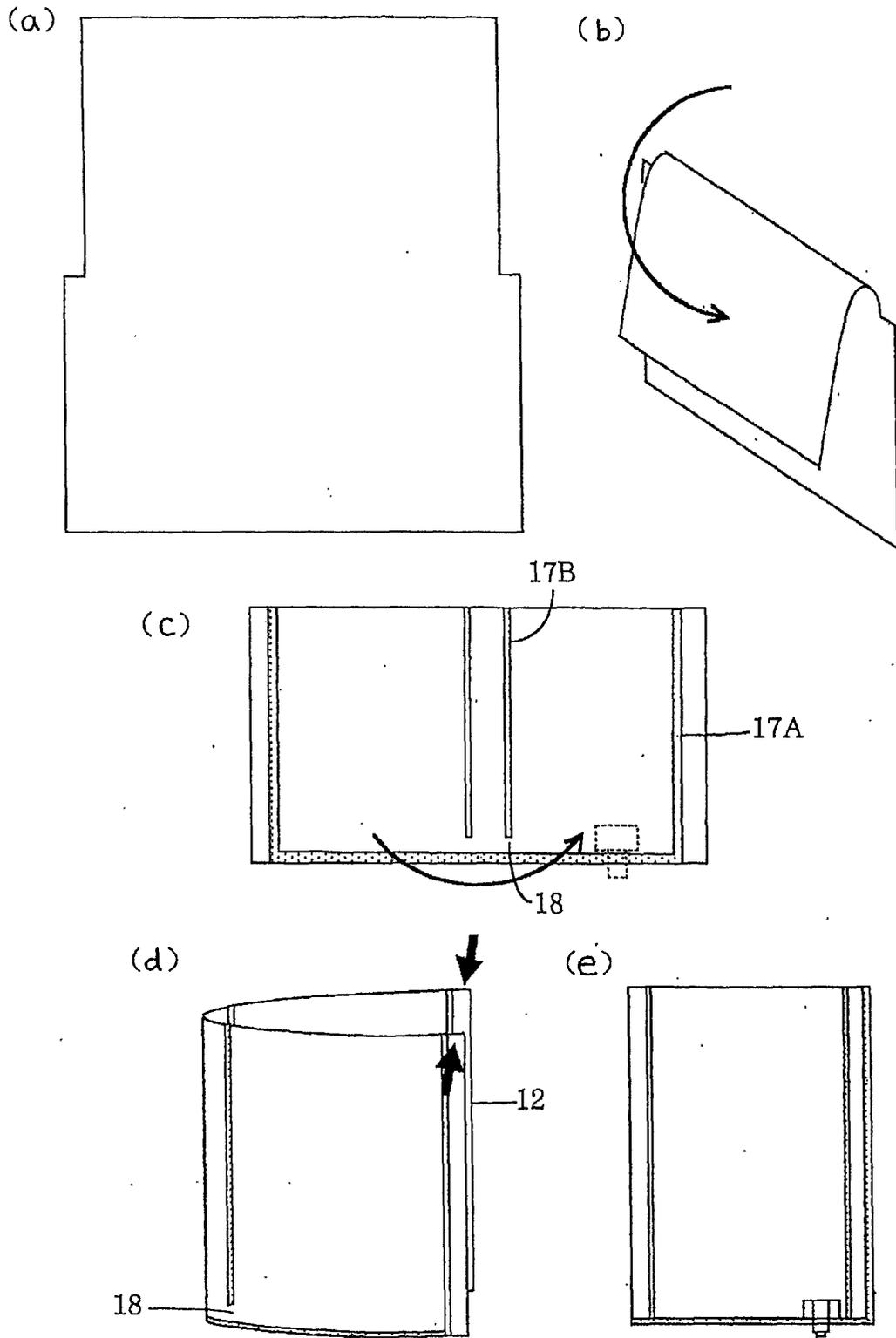


Fig.24

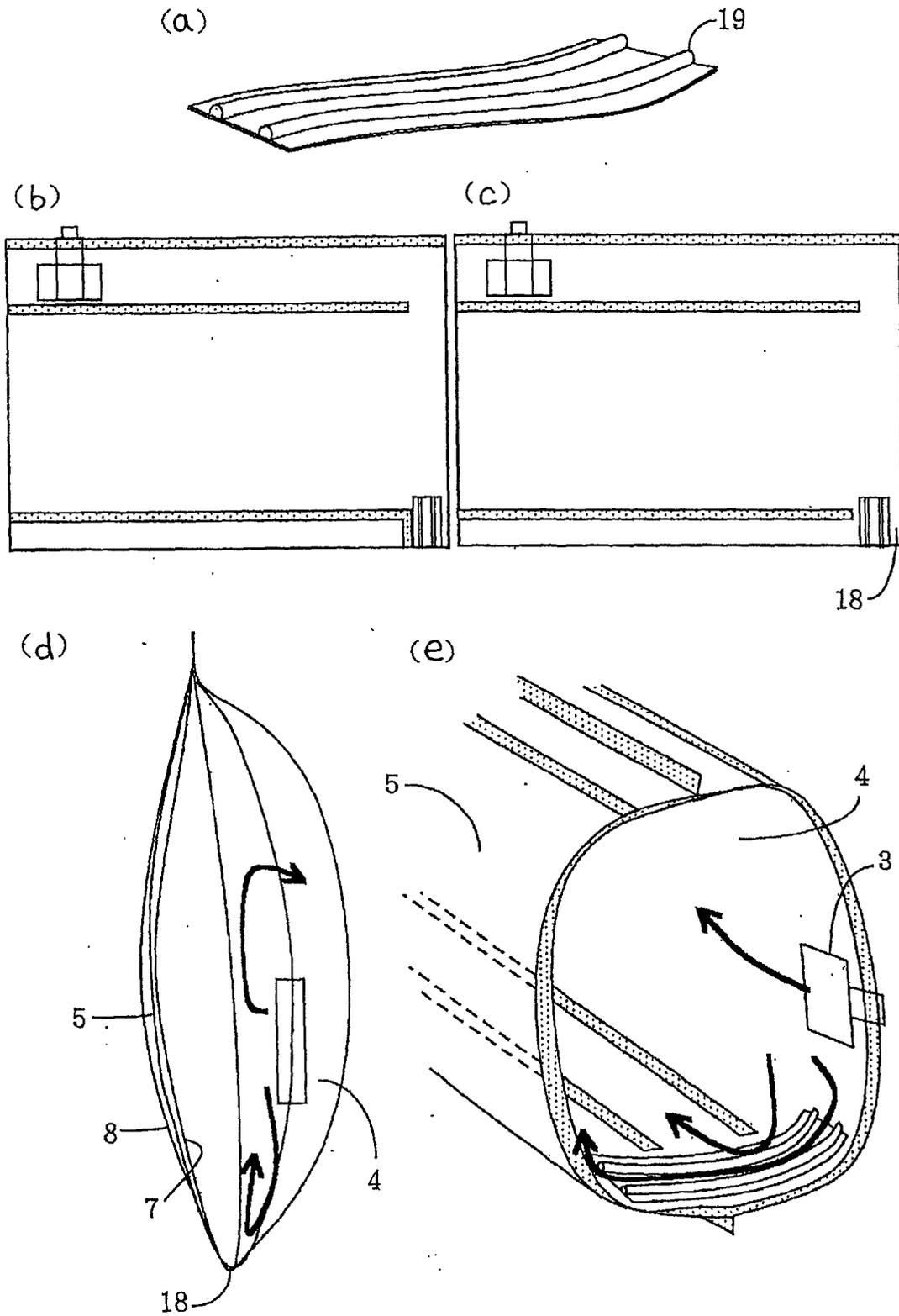


Fig.25

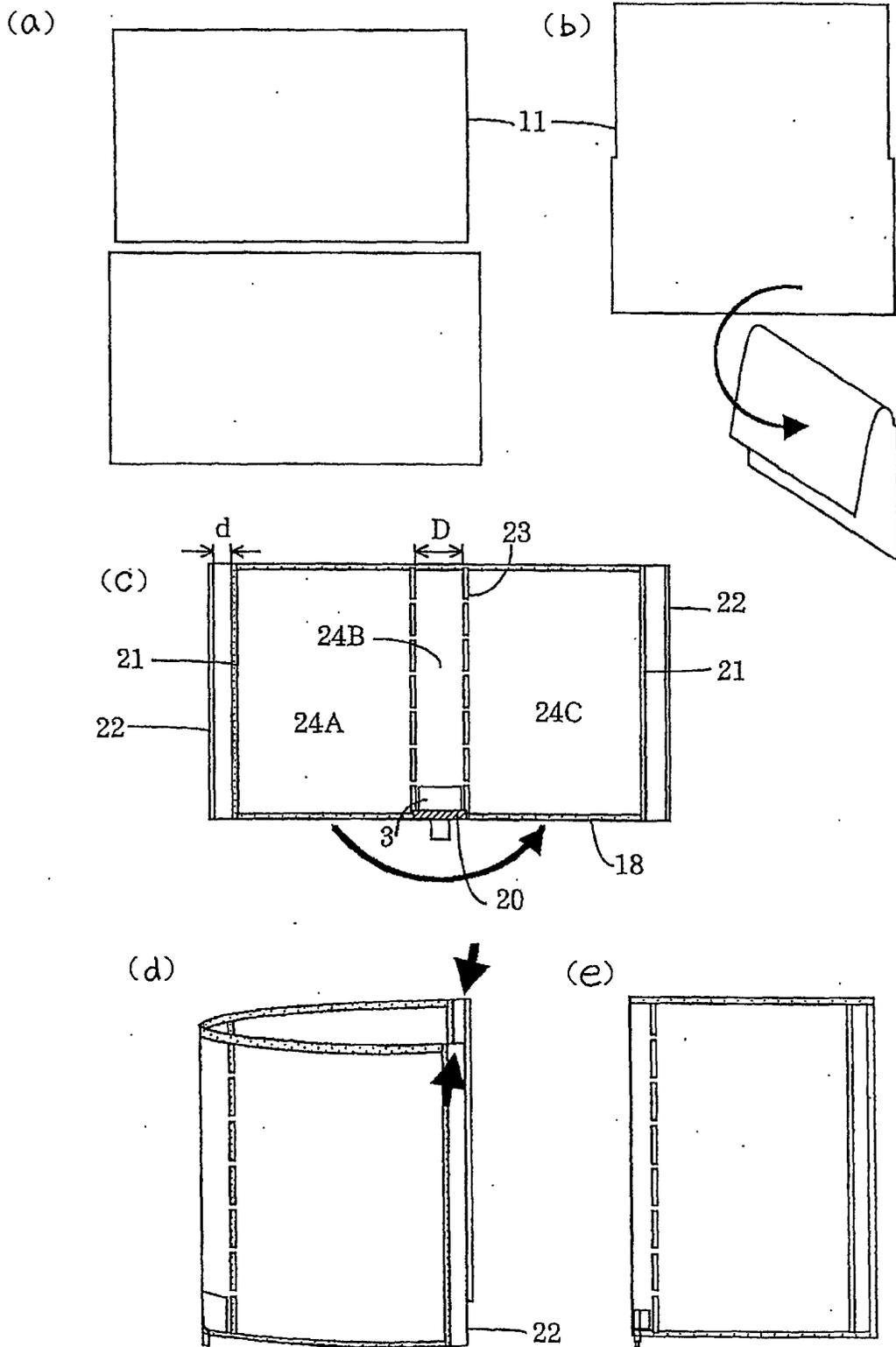
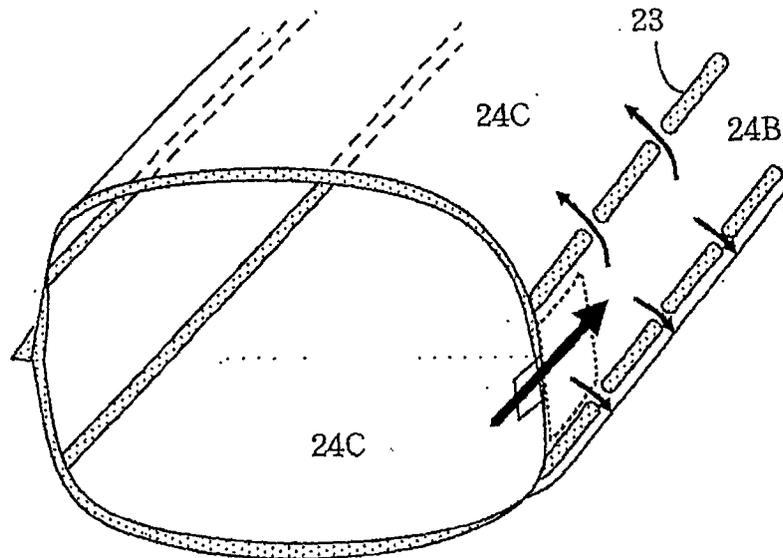


Fig. 26

(a)



(b)

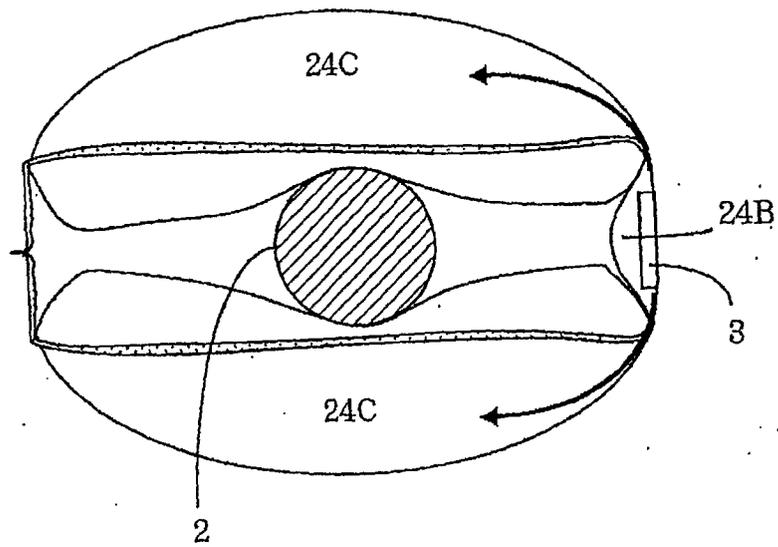


Fig.27

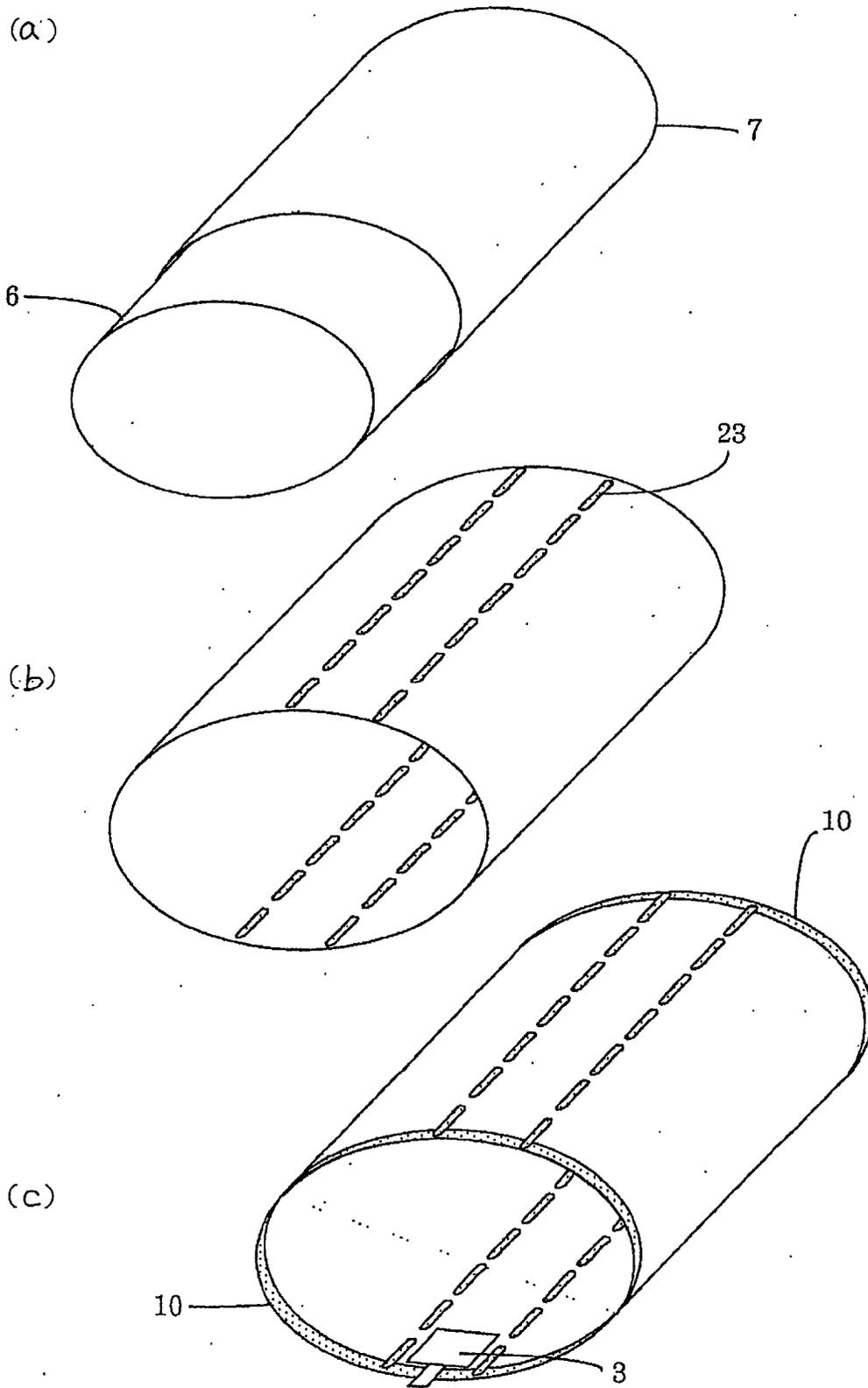
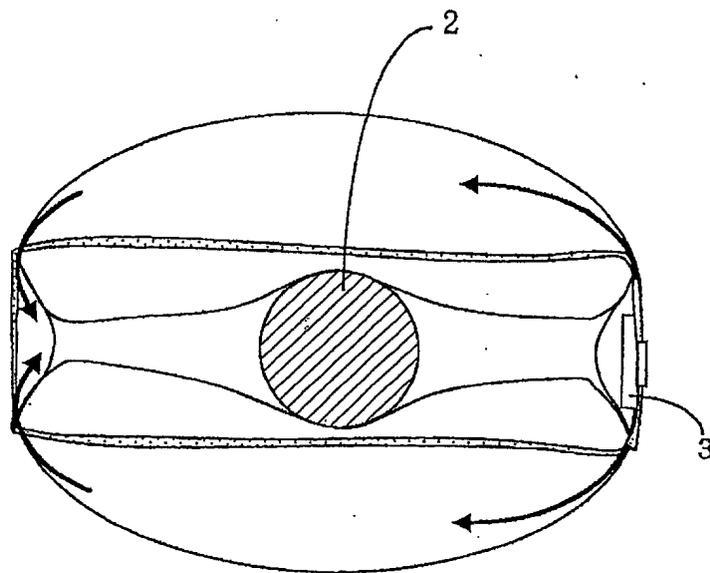


Fig.28



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP00/08262

<p>A. CLASSIFICATION OF SUBJECT MATTER Int.Cl⁷ B65D81/07</p> <p>According to International Patent Classification (IPC) or to both national classification and IPC</p>																	
<p>B. FIELDS SEARCHED</p> <p>Minimum documentation searched (classification system followed by classification symbols) Int.Cl⁷ B65D81/07</p> <p>Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Jitsuyo Shinan Koho 1922-1996 Toroku Jitsuyo Shinan Koho 1994-2001 Kokai Jitsuyo Shinan Koho 1972-2001 Jitsuyo Shinan Toroku Koho 1996-2001</p> <p>Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)</p>																	
<p>C. DOCUMENTS CONSIDERED TO BE RELEVANT</p> <table border="1"> <thead> <tr> <th>Category*</th> <th>Citation of document, with indication, where appropriate, of the relevant passages</th> <th>Relevant to claim No.</th> </tr> </thead> <tbody> <tr> <td>X Y</td> <td>JP, 10-225340, A (Tadashi HAGIWARA), 25 August, 1998 (25.08.98), Full text; Figs. 1 to 12 (Family: none)</td> <td>1, 6 2-5, 7-12</td> </tr> <tr> <td>Y</td> <td>JP, 3-505855, A (Steven N, Ledermen), 19 December, 1991 (19.12.91), Full text; Figs. 1 to 23 & AU, 5161990, A & CA, 2009365, A & WO, 90009320, A2 & EP, 429562, A</td> <td>2, 7, 8</td> </tr> <tr> <td>Y</td> <td>JP, 10-329869, A (Yamamon K.K.), 15 December, 1998 (15.12.98), Full text; Figs. 1 to 21 (Family: none)</td> <td>3, 11, 12</td> </tr> <tr> <td>Y</td> <td>JP, 10-505311, A (Luca, Nicholas Paolo De), 26 May, 1998 (26.05.98), Full text; Figs. 1 to 10 & DE, 69416679, C & WO, 95002548, A & CA, 2167414, A & US, 5454642, A & EP, 708730, A & DE, 69416679, T</td> <td>4</td> </tr> </tbody> </table>			Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	X Y	JP, 10-225340, A (Tadashi HAGIWARA), 25 August, 1998 (25.08.98), Full text; Figs. 1 to 12 (Family: none)	1, 6 2-5, 7-12	Y	JP, 3-505855, A (Steven N, Ledermen), 19 December, 1991 (19.12.91), Full text; Figs. 1 to 23 & AU, 5161990, A & CA, 2009365, A & WO, 90009320, A2 & EP, 429562, A	2, 7, 8	Y	JP, 10-329869, A (Yamamon K.K.), 15 December, 1998 (15.12.98), Full text; Figs. 1 to 21 (Family: none)	3, 11, 12	Y	JP, 10-505311, A (Luca, Nicholas Paolo De), 26 May, 1998 (26.05.98), Full text; Figs. 1 to 10 & DE, 69416679, C & WO, 95002548, A & CA, 2167414, A & US, 5454642, A & EP, 708730, A & DE, 69416679, T	4
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.															
X Y	JP, 10-225340, A (Tadashi HAGIWARA), 25 August, 1998 (25.08.98), Full text; Figs. 1 to 12 (Family: none)	1, 6 2-5, 7-12															
Y	JP, 3-505855, A (Steven N, Ledermen), 19 December, 1991 (19.12.91), Full text; Figs. 1 to 23 & AU, 5161990, A & CA, 2009365, A & WO, 90009320, A2 & EP, 429562, A	2, 7, 8															
Y	JP, 10-329869, A (Yamamon K.K.), 15 December, 1998 (15.12.98), Full text; Figs. 1 to 21 (Family: none)	3, 11, 12															
Y	JP, 10-505311, A (Luca, Nicholas Paolo De), 26 May, 1998 (26.05.98), Full text; Figs. 1 to 10 & DE, 69416679, C & WO, 95002548, A & CA, 2167414, A & US, 5454642, A & EP, 708730, A & DE, 69416679, T	4															
<p><input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex.</p>																	
<p>* Special categories of cited documents:</p> <table border="0"> <tr> <td>"A" document defining the general state of the art which is not considered to be of particular relevance</td> <td>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</td> </tr> <tr> <td>"E" earlier document but published on or after the international filing date</td> <td>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</td> </tr> <tr> <td>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</td> <td>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</td> </tr> <tr> <td>"O" document referring to an oral disclosure, use, exhibition or other means</td> <td>"&" document member of the same patent family</td> </tr> <tr> <td>"P" document published prior to the international filing date but later than the priority date claimed</td> <td></td> </tr> </table>			"A" document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention	"E" earlier document but published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone	"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art	"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family	"P" document published prior to the international filing date but later than the priority date claimed						
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<p>Date of the actual completion of the international search 19 January, 2001 (19.01.01)</p>		<p>Date of mailing of the international search report 30 January, 2001 (30.01.01)</p>															
<p>Name and mailing address of the ISA/ Japanese Patent Office</p>		<p>Authorized officer</p>															
<p>Facsimile No.</p>		<p>Telephone No.</p>															

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP00/08262

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	FR, 2711115, A (HIGH TECH PACK-AGING FRANCE), 21 April, 1995 (21.04.95), Full text; Figs. 1 to 10	5
Y	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No.33571/1991 (Laid-open No.121273/1992) (Kabushiki Kaisha Kashiwabara Seitai), 29 October, 1992 (29.10.92), Full text; Figs. 1 to 11 (Family: none)	6-9
Y	JP, 7-76368, A (Z.K. Jaszai), 20 March, 1995 (20.03.95), Full text; Figs. 1 to 16 & DE, 69408723, C & US, 5476175, A & EP, 627364, A	10

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