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(54) Air-exaustible bag for storing articles.

(57) An air-exhaustible bag for storing articles therein at vacuum, which has an improved closure to close an opening smoothly and hermetically, is provided. The air-exhaustible bag comprises a bag body, an opening (4) being defined by the first and second walls (2a,2b) on a side of the bag body, an air exhaust port (6) being defined on either one of the first and second walls (2a,2b). The first and second walls (2a,2b) are made of a material which can inherently be sealed to itself merely by contact and separated from each other without adversely affecting each surface thereof. Whereby the opening (4) can hermetically and separably be closed.

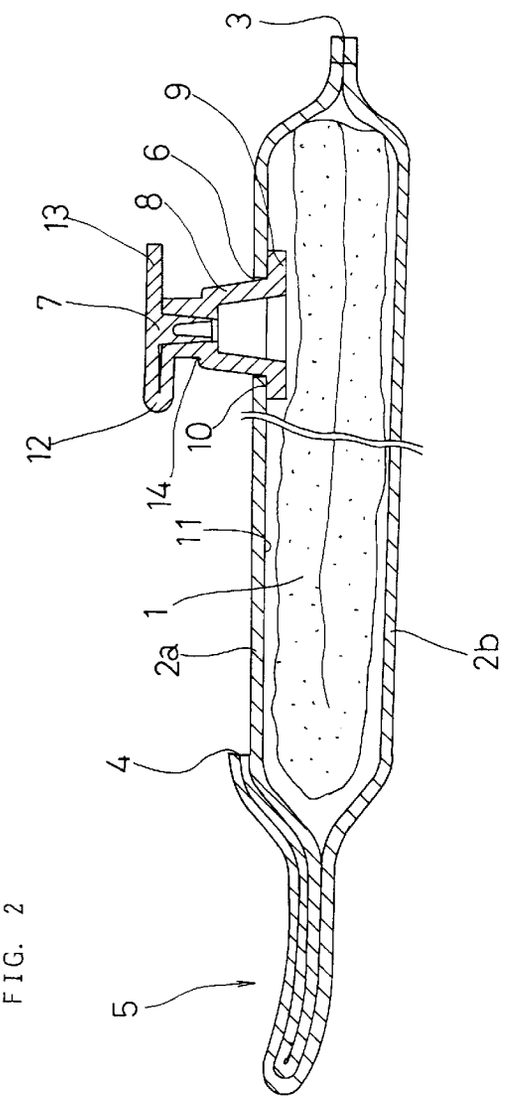

FIG. 2

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This invention relates to an air-exaustible bag for storing articles such as thick towels and garments compactly therein, which are likely to be swelled once air has entered the articles.

There are hitherto provided air-exaustible bags for storing bedclothes, clothes or the like in a closet or the like compactly, which are out of season and may not be used for relatively a long period, and storing clothes or the like in a trunk compactly during travel.

Japanese Utility Model Laid-Open No. 61-69045 discloses a bag of this type as illustrated in FIG. 7. It discloses a storage bag comprising a bag body 21 being made of synthetic resin film, an opening 22 being defined on a side of the bag, mating portions of a slide fastener 24 being respectively affixed to opposed edges 23 of parallel walls of the opening 22, an air exhaust port 25 being defined on the bag body 21. In practice, an article 1 is placed in the bag body 21 through the opening 22. The opening 22 is sealed by sliding a slide of the slide fastener 24 and clcsing the slide fastener 24. The air present in the bag body 21 is evacuated through the air exhaust port 25, then inner surfaces of the bag body 21 is subjected to a negative pressure. Whereby, the article 1 is compressed and maintained in the bag compactly.

However, it is difficult to seal the bag body 21 by closing the the slide fastener 24, due to the fact that unless the fastener 24 has been perfectly closed, air may enter the bag body 21 from an unclosed portion. In addition, the negative pressure applied to the inner surfaces of the bag body 21 may overcome the sealing force of the fastener 24, thus the fastener 24 may forcibly be opened and the air may unexpectedly be introduced into the bag body 21 from a broken portion. Further, It is difficult to maintain the article 1 at vacuum in the bag body 21 when the bag is subjected to prolonged storage.

Japanese Utility Model Publication No. 3-56536 also discloses a bag of this type. A construction of this bag is mostly similar to those of the above-described bag except that an inner surface of an substrate of the bag body 21 is coated with an adherent sheet by heating and melting both of the bag body 21 and the adherent sheet.

As other construction of the bag, a substrate of the bag body 21 can be laminated with a heat sensitive adhesive to form a double layered substrate.

Japanese Patent Laid-Open No. 1-139346 further discloses a bag of this type as illustrated in FIG. 8, in which an opening 22 is provided on opposite inner surfaces thereof with a fusion fastener 28 which is fused and closed by the application of heat. In practice, an article 21 is placed in the bag body 21, the fusion fastener 28 is fused and sealed by pressing the same with a hot iron. Then, the air present in the bag body is forcibly evacuated through an air exhaust port 29. Thus, an article 1 is compressed with the negative pressure and maintained in the bag compactly.

However, when the bag is closed through the adherent sheet coating or the fusion fastener, it is necessary to press these areas with an hot iron. This is relatively a hectic and time-consuming work for the home user.

In addition, when a pressure and a heat are applied to a double-layered substrate of the above-described bag, the pressure and heat applied portion may be irregularly lengthened, and subsequently wrinkled. Because each of materials used in the double-layered substrate have a different coefficient of extension against heat or pressure. Thus, it is difficult to seal the opening accurately and hermetically.

Accordingly, it is a major object of the present invention to provide an air-exaustible bag, having an improved closure for closing the bag which is adapted for storing swelled articles with air such as towels and garments compactly and easily therein at vacuum.

To achieve the above object, there is provided an air-exhaustible bag for storing articles therein at vacuum comprising first and second walls being sealingly joined along a major portion of their sides and bottom portions to form a bag body, an opening being defined by top edges of the first and second walls, an air exhaust port being defined on either one of the first and second walls, wherein the first and second walls are made of a material which can inherently be sealed to itself merely by contact and separated from each other without adversely affecting each surface thereof, whereby the opening can be hermetically and separably closed.

In the air-exaustible bag of the present invention, since the bag body is made of a sheet material which can inherently be sealed to itself merely by contact, the closure for the bag body can be easily achieved by overlapping the first wall on the second wall at any place except a place where the article is interposed. If an overlapped place is folded at least one time, the sealing effect can be increased, thus the hermetical closure can be achieved at any place of the bag easily.

Upon sealing the bag body, the air present therein are evacuated through the air exhaust port with a reciprocal pump or the like. The swelled article in the bag body can be compressed with a negative pressure, while its dimension is reduced. The article in the bag body of the present invention is thus compactly stored in a closet, a trunk or the like for a long period of time.

The present invention will be more fully understood from the detailed description given hereinbelow read in conjunction with the accompanying drawings, which are given by way of illustration only, and thus are not limitative of the present invention, and wherein:

FIG. 1 illustrates a perspective view of an air-exhaustible bag in accordance with one embodi-

ment of the present invention;

FIG. 2 illustrates a cross-section of the bag of FIG. 1;

FIG. 3 illustrates a perspective view of the bag in accordance with another embodiment of the present invention;

FIG. 4 illustrates a plan view of a reciprocating pump used for the bag of the present invention;

FIG. 5 illustrates a cross-section of the reciprocating pump of FIG. 4 taken along reference line A-A;

FIG. 6 illustrates a perspective view in which the bag and the pump of the present invention are placed in a trunk; and

FIGS. 7 and 8 illustrate air-exhaustible bags in accordance with the prior art.

FIGS. 1 and 2 show an air-exhaustible bag constructed in accordance with one embodiment, which comprises a first wall 2a and a second wall 2b being of substantially the same length and being sealingly joined along a major portion of their sides and bottom portions to form a bag body 5, an opening 4 being defined by the top edges of the first and second walls, an air exhaust port 6 being defined on the first wall 2a, a cylindrical pipe 8 projecting outwardly away from the air exhaust port 6, and the cylindrical pipe 8 being provided at its top end with a plug 7.

The first and second walls of the bag body 5 are made of soft vinyl chloride, polybutadiene, or polyvinyliden chloride. It is commonly known that each of these materials can inherently be sealed to itself when each of the materials has been brought into contact in an overlying relationship. Sealing effect can be increased by applying a slight pressure to contacted areas of those materials with hand or the like. However, the application of the pressure is not necessary step for the sealing. Once each of the materials has been intimately contacted to itself, the hermetical sealing effect for the bag body 5 can be obtained, thus air hardly passes through the intimately contacted portion. In addition, each of the materials can smoothly be separated from itself without adversely affecting their surfaces by applying the peeling force thereon. Therefore, the bag body 5 of the present invention can be freely and separably closed by joining the first and second walls together at any places thereof, while preventing the air from entering the bag body 5.

Optionally, the bag body 5 may be constructed with gussets 40 as illustrated in FIG. 3 such that a space in the bag body 5 can be adjusted for fitting itself to a size of the article 1. Thus a relatively thick articles such as sweaters can be easily placed and maintained in the bag without the deformation thereof.

In this embodiment, substantially the whole length of the side of the bag body 5 are used to define the opening 4. However, the opening can be defined in a partial length of the top edges of the walls 2a and 2b, or a corner of the bag body by cutting the corner diagonally.

The cylindrical pipe 8 comprising thermoplastic resin is affixed to the first wall 2a. A flange 9 is formed at a lower end of the cylindrical pipe 8. The flange 9 is of a large diameter as compared with that of the air exhaust port 6. An upper surface of the flange 9 is fused to an inner surface of the first wall 2a by heating.

The cylindrical pipe 8 is tapered to the upper portion thereof. The cylindrical pipe 8, a hinge 12, a plug 3 and a collar 13 are integrally formed as illustrated in FIG. 2. A step portion 14 is formed in a middle portion of the cylindrical pipe 8. In accordance with this arrangement, when the plug 7 is pressed at its top end, it is pressed into the bag body 5 such that a portion projecting outwardly away from the surface of the first wall 2a can be ommited. Thus, these elements are hardly damaged with unexpected impacts, pressures or the like.

In this embodiment, the cylindrical pipe 8 is preferably tapered to the upper portion thereof. However it is not necessary to limit the cylindrical pipe 8 to such a configuration. A variety of configurations can be employed. It is important to form the cylindrical pipe 8 such that air present in the bag body 5 can be evacuated smoothly through the air exhaust port 6.

Further, a reciprocating pump 15 of a compact type can be separably attached to the cylindrical pipe 8 through a pipe 17 for the air passage, to which a nozzle 16 is affixed to evacuate the air in the bag body 5.

Refering now to FIGS. 4 and 5, the reciprocating pump 15 adapted for evacuating the air present in the bag body 5 comprises a barrel 31, a plunger 34 being movably inserted in the barrel 31, a first port 30 being provided at an top end of the barrel 31, a second port 32 being provided at an top end of the plunger 34, and a handle 33 being formed at an opposite end of the plunger 34.

A first nozzle 36 is affixed to the first port 30 such that the reciprocating pump 15 or the pipe 17 can be separably attached to the first port 30. The pipe 17 is provided at its opposite end with a nozzle 16. A first check valve 35 is arranged in the fist nozzle 36 in such a manner as to prevent the reverse flow of the air when the air present in the bag body 5 is evacuated.

A second nozzle 38 is affixed to the second port 32 of the plunger 34 such that the air drawn in the barrel 31 is subsequently drawn in the plunger 34 through the second nozzle 38. A second check valve 37 is arranged in the second nozzle 38 in such a manner as to prevent the reverse flow, when the air in the barrel 31 is drawn into the plunger 34. An air vent hole 39 is defined in a side wall of the plunger 34 such that the air drawn in the plunger 34 is exhausted outside.

The steps of storing articles in accordance with the above embodiment will be described hereinbelow.

The article 1 is placed in the bag body 5 through the opening 4 and inner surfaces of the first wall 2a and the second wall 2b are overlapped to one another. And a slight pressure is applied onto the overlapped area for an intimate contact. Then, the intimately contacted area of the first wall 2a and the second wall 2b are folded toward a center portion of the bag one time for secured sealing as illustrated in Fig. 2. Thus, the hermetical closure for the bag can be easily obtained. If necessary, more secured closure can be obtained by folding the intimately contacted area several times.

The plug 7 is detached from the cylindrical pipe 8 on the first wall 2a to connect one end of the pipe 17 with the cylindrical pipe 8 through the first nozzle 36 of the pipe 17. The opposite end of the pipe 17 is connected to the reciprocating pump 15 through the nozzle 16 of the pipe 17. Then, the air present in the bag body 5 is evacuated by reciprocating motions of the plunger 34 until the article 1 is compressed and hardened with the negative pressure applied thereto. After the air has been evacuated, the pipe 17 is detached from the cylindrical pipe 8 and the plug 7 is pushed at its top end onto the cylindrical pipe 8 to close the cylindrical pipe 8 and place the cylindrical pipe 8 in the bag body 5.

Thus, the swelled article 1 in the bag body 5 becomes flattened and its dimension is reduced together with the bag body 5. The air exhaustible bag of the present invention provides an easy storage of the article 1 in a closet, a trunk or the like. FIG. 6 illustrates a storage state of such a flattened article as one example, in which the article 1 is neatly placed in a trunk 18, and the reciprocating pump 15 and the pipe 16 are affixed to a cover 19 of the trunk 18 with bands 20. Whereby, the article 1 can conveniently be stored in the bag body 5 compactly at vacuum in any place.

When the bag body 5 is to be opened, the intimately contacted area of the first wall 2a and the second wall 2b are separated from each other without adversely affecting inner surfaces of the walls 2a and 2b. The bag can be used repeatedly in this manner.

In this embodiment, the reciprocating pump 15 is employed to evacuate the air present in the bag body 5. However, an electric vacuum pump or the like can be used in place of the reciprocating pump 15. A variety of configurations and functions of the reciprocating pump 15 can be selected within the scope of the present invention.

This specification is by no means intended to restrict the present invention to the preferred embodiments set forth therein. Various modifications to the inventive air-exhaustible bag as described herein, may be made by those skilled in the art without departing from the spirit and scope of the present invention.

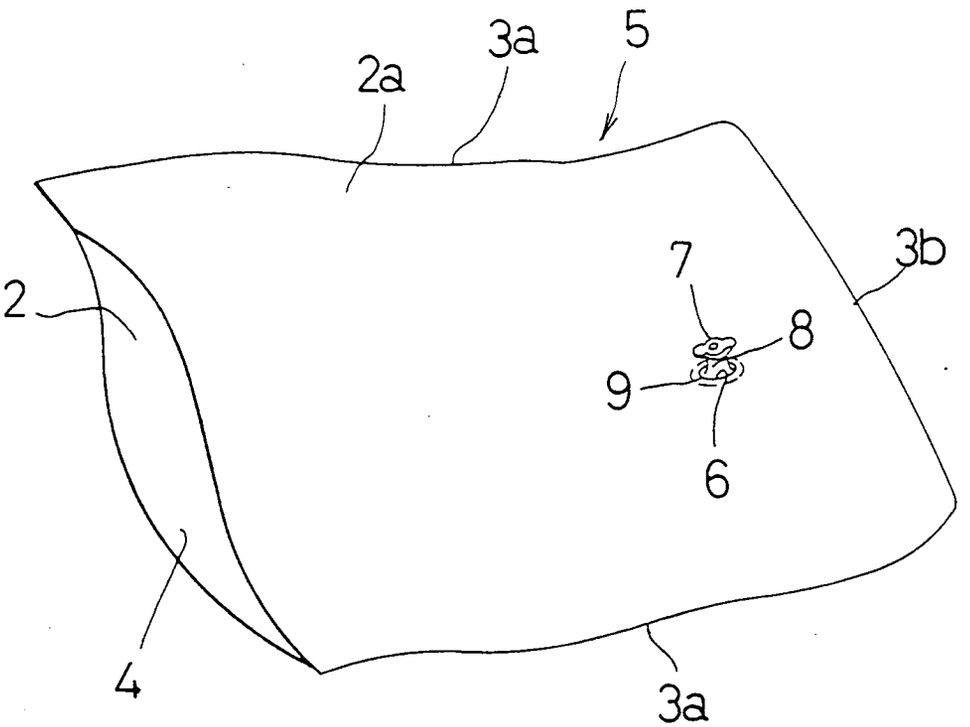
Claims

1. An air-exhaustible bag for storing articles therein at vacuum comprising a first wall (2a) and a second wall (2b) being sealingly joined along a major portion of their sides (3a) and bottom (3b) to form a bag body (5), an opening (4) being defined by top edges of said first and second walls, an air exhaust port (6) being defined on either one of said first and second walls, characterized in that said first wall (2a) and said second wall (2b) are made of a material which can inherently be sealed to itself merely by contact and separated from each other without adversely affecting each surface thereof, whereby said opening (4) can be hermetically and separably closed.

2. The air-exhaustible bag of claim 1, wherein a reciprocating pump (15) is detachably connected to said air exhaust port (6) through a cylindrical pipe (8).

3. An air-exhaustible bag of claim 2, wherein said reciprocating pump (15) comprises a barrel (31), a plunger (34) being movably inserted in said barrel (31), a first port (30) being provided at an top end of said barrel (31), a second port (32) being provided at an top end of said plunger (34), a handle (33) being formed at an opposite end of said plunger (34), a first check valve (35) being provided in said first port (30) in such a manner as to draw the air present in said bag body (5) into said barrel (31) and to prevent the reverse flow of the air, and a second check valve (37) being provided in said second port (32) in such a manner as to draw the air present in said barrel (31) into said plunger (34) and to prevent the reverse flow of the air.

FIG. 1



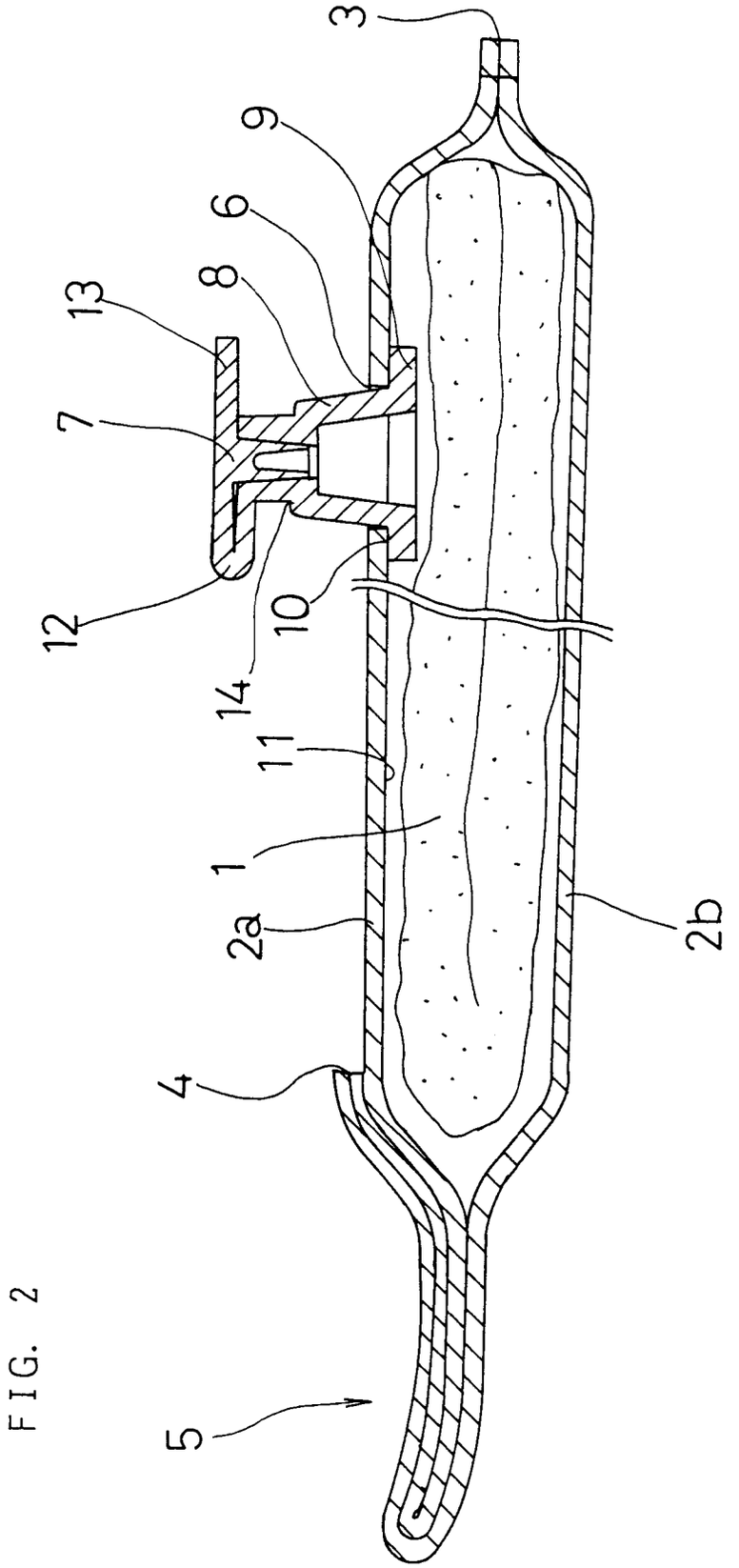
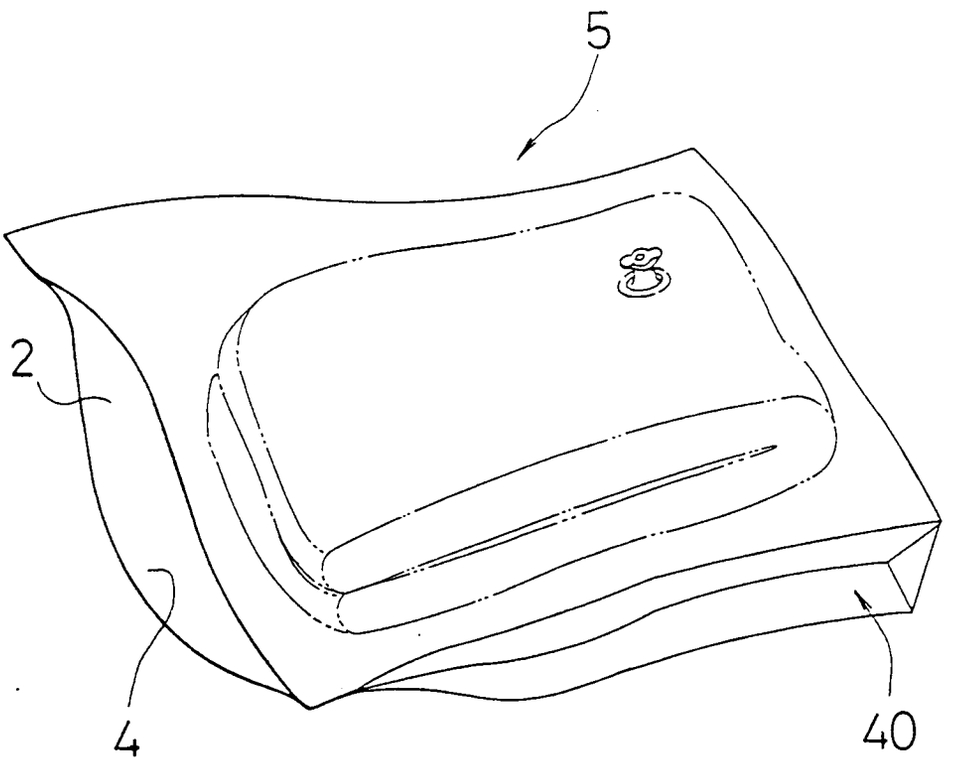


FIG. 2

FIG. 3



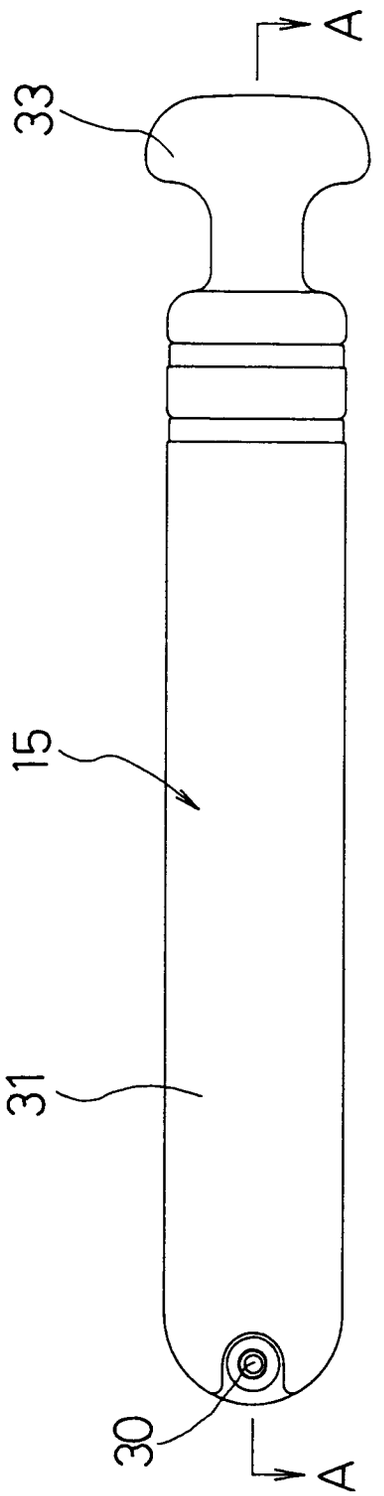


FIG. 4

FIG. 5

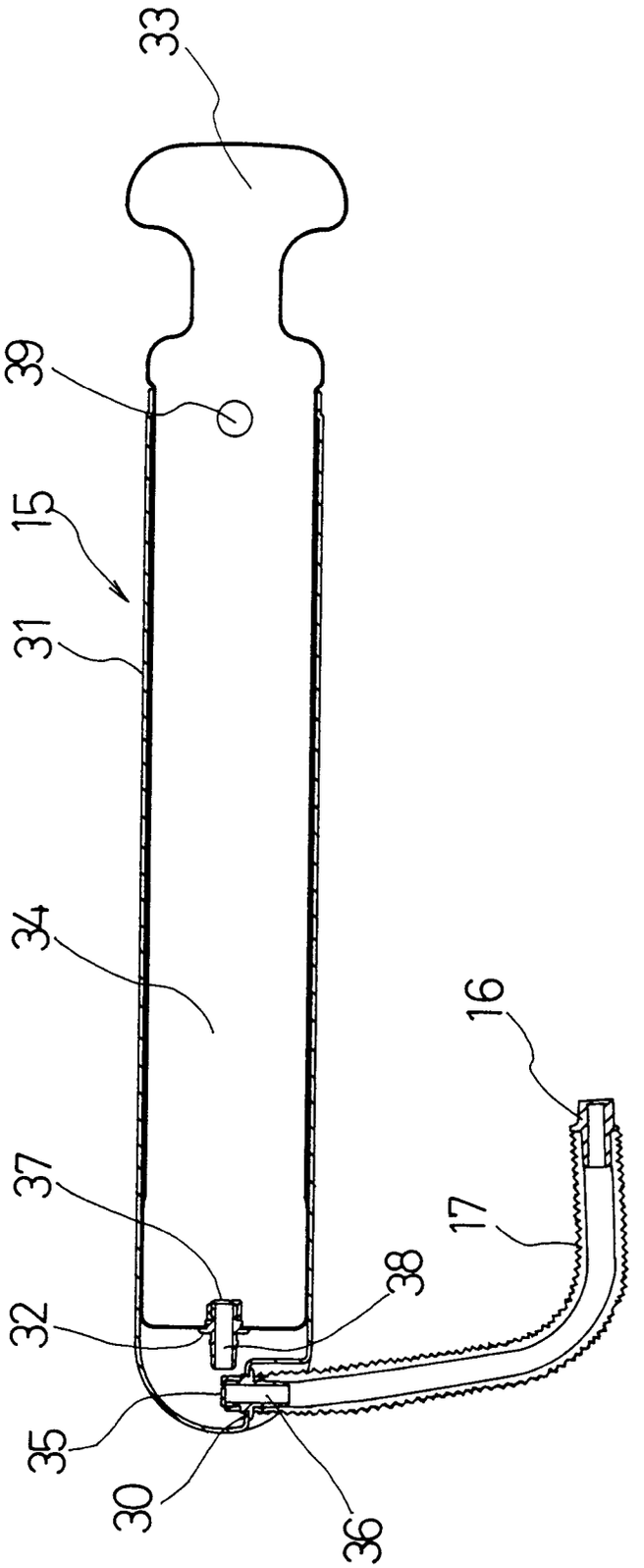


FIG. 6

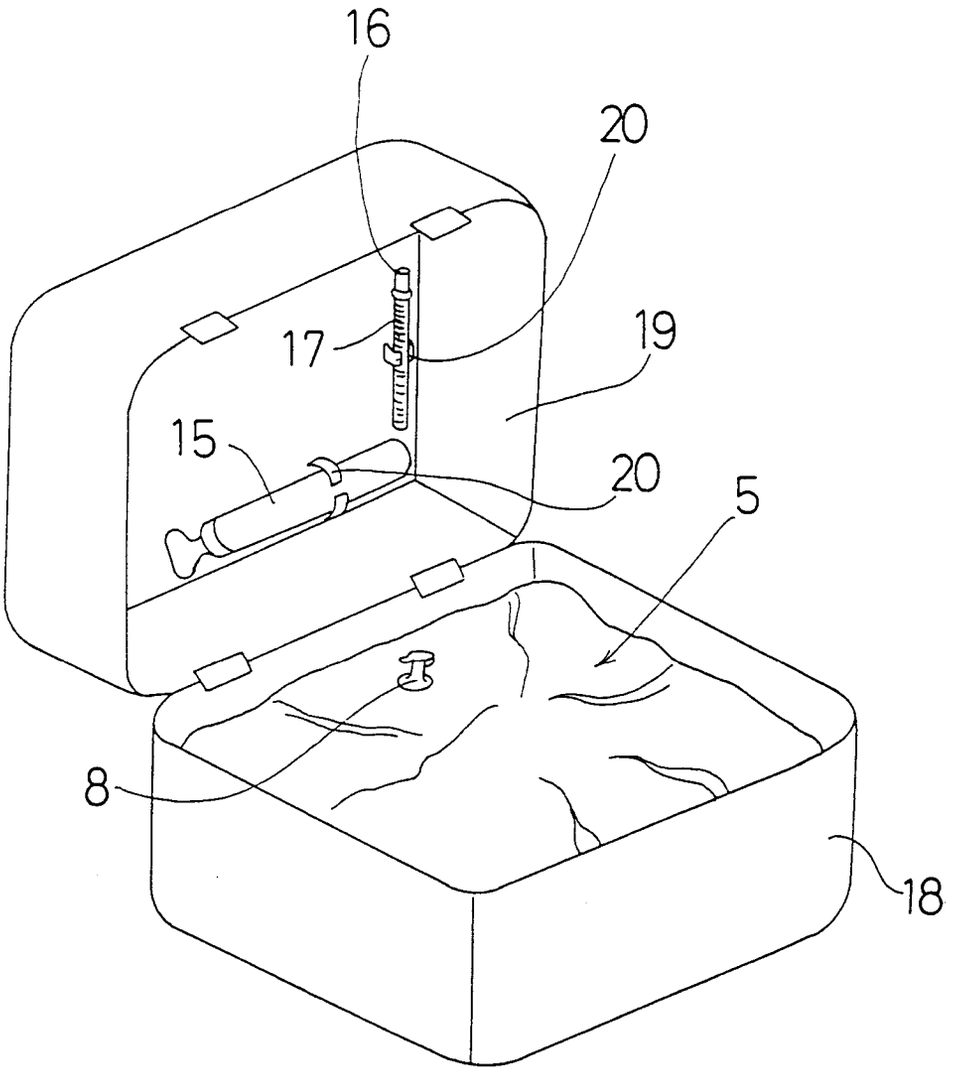


FIG. 7
PRIOR ART

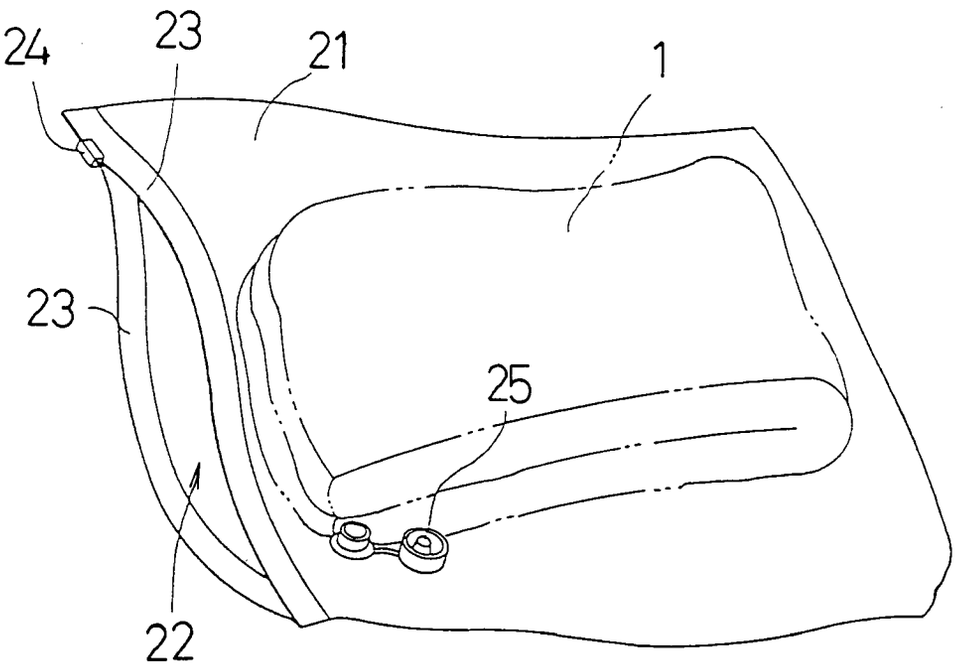


FIG. 8
PRIOR ART