



(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 153(4) EPC

(43) Date of publication:
23.03.2011 Bulletin 2011/12

(51) Int Cl.:
B65D 47/08 (2006.01) B65D 5/74 (2006.01)

(21) Application number: **08763972.0**

(86) International application number:
PCT/JP2008/001375

(22) Date of filing: **30.05.2008**

(87) International publication number:
WO 2009/144769 (03.12.2009 Gazette 2009/49)

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MT NL NO PL PT RO SE SI SK TR
Designated Extension States:
AL BA MK RS

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(54) **INTEGRALLY FORMED ATTACHMENT CAP WITH LID OPENED BY SINGLE PUSH**

(57) A thin attachment cap capable of simply taking out contents from a container containing drinking water, juice, powder or the like. In the attachment cap (30), by pressing down a pushing operation section (33) in the direction of an arrow (34) while a lid body (31) is closed, the lid body (31) rotates in the direction of an arrow (35)

and a pouring opening (37) is opened. When the pushing operation section (33) is completely pressed down, the lid body (31) stands up approximately at the right angle with respect to a cap base (32). When the lid body (31) stands up, the lid body (31) is temporarily fixed, and a liquid or the like in the container can be smoothly taken out through the pouring opening (37).

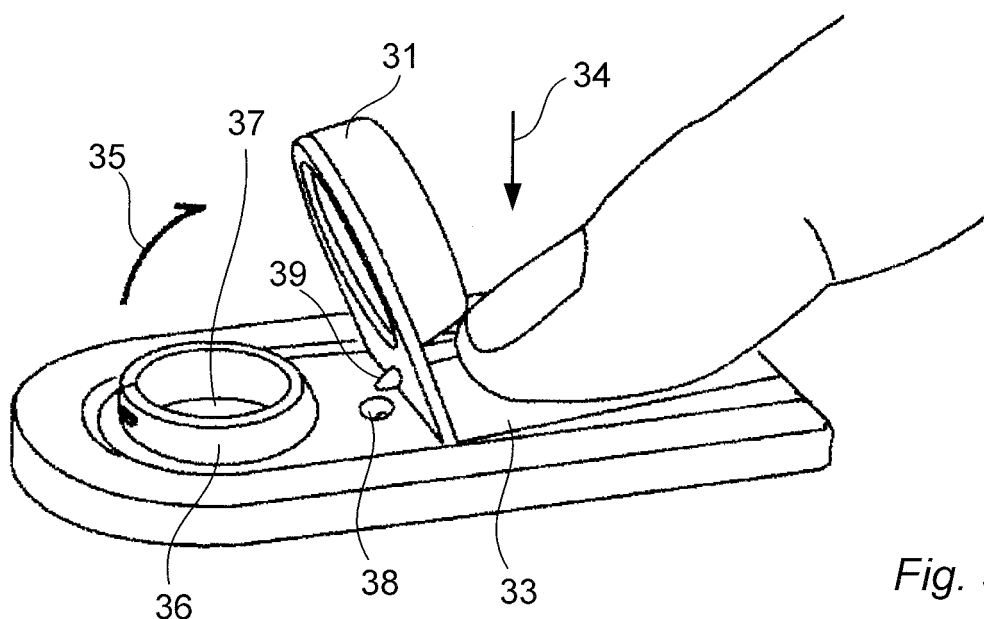


Fig. 3B

Description

Technical Field

[0001] The present invention relates to an attachment cap attached to a container containing a liquid or the like, and more particularly to an attachment cap allowing its lid to be opened by a single push.

Background Art

[0002] It would be very convenient to be able to smoothly take out a liquid or the like from a container containing the liquid or the like by a single handed operation. There have been proposed various cap mechanisms of this kind allowing a lid to be opened by a single push.

[0003] For example, U.S. Patent No. 5730310 discloses a lid opening mechanism in which, particularly in Figure 30, a pushing operation section 5 is formed on a side surface of a case 11 and the pushing operation section 5 is pushed from a lateral direction thereof to rotate a lid section 12 around a bending line 21. According to this mechanism, as illustrated in Figure 31, it is understood that the lid section 12 rotates around a support section 24. As the lid section 12 rotates, the bending line 21 gets into a space formed between the pushing operation section 5 and the support section 24. In other words, the lid section 12 rotates by leverage using a support section 24 as the fulcrum.

[0004] Alternatively, as illustrated in Figure 1A according to the present application, an attachment cap 12 is attached to a paper carton pack 11 to take out juice or the like contained in the paper carton pack 11. In order to open the attachment cap 12, as illustrated in Figure 1B, first, the paper carton pack 11 is held by one hand and a lid body 13 of the attachment cap 12 is lifted by the other hand so as to open a pouring opening 15 of a cap base 14. Then, juice or the like, which are contents, can be poured into a glass through the pouring opening 15.

Disclosure of the Invention

Problems to be Solved by the Invention

[0005] According to the above embodiment disclosed in U.S. Patent No. 5730310, the pushing operation section 5 is pushed by a finger and thus in order to improve the operability, the pushing operation section 5 needs to have a wide area to some extent. This imposes a limitation that the case 11 cannot be very thin. Further, in order to increase the volume of the case 11, it is preferable to provide a small space formed between the pushing operation section 5 and the support section 24. However, the smaller the space, the smaller the lever ratio (a ratio of the distance from a fulcrum point to a force applied point divided by the distance (corresponding to the length

of the lid section 12) from the fulcrum point to an operating point). Therefore, as the lid section 12 becomes larger, the stronger pushing pressure is needed.

[0006] Further, the attachment cap 12 illustrated in Figure 1A involves the inconvenience that both hands are required to open it. Furthermore, when a liquid is to be taken out, air will flow back inside the paper carton pack 11 through the pouring opening 15, and thus involves the inconvenience of preventing the liquid from being smoothly taken out.

Means for Solving the Problems

[0007] The present invention has been made to solve the above problems and provides an attachment cap allowing contents such as a liquid to be smoothly taken out from a container. More specifically, the present invention provides a cap mechanism which allows its lid to be opened by a single push as well as a further thinner attachment cap which allows its lid to be opened by a small force.

[0008] In light of this, the attachment cap according to the present invention includes a cap base, a hinge section adjacently connected to the cap base, and a lid body adjacently connected to the hinge section. The cap base has a pouring opening for taking out contents. The hinge section includes a pushing operation section rotatably connected adjacently to one end of the cap base and a correction arm section formed parallel to and spaced apart from the pushing operation section. The lid body is rotatably connected adjacently to the other end of the pushing operation section and the correction arm section and has a plug section for sealing the pouring opening. In the attachment cap configured in this manner, the cap base has a receiving region capable of receiving the pushing operation section on an upper surface of the cap base facing an attachment surface of the cap base, and a bottom surface of the receiving region is formed lower than the surface on which the correction arm section abuts against the upper surface. In a state in which the pouring opening is sealed by the plug section, when the pushing operation section is pushed out into the receiving region, the lid body rotates to release the plug section from the pouring opening.

[0009] Further, the attachment cap according to the present invention includes not only the above configuration but also an air vent separately from the pouring opening provided on the cap base, in which the lid body includes a plug section and an air vent plug section fit to the pouring opening and the air vent respectively.

Advantages of the Invention

[0010] The present invention can form a shallow region for operating the pushing operation section and thus can provide a thin attachment cap allowing its lid to be opened by a single push. Further, the pushing operation section can be pushed from an upper portion of the attachment

cap and thus a relatively strong force can be applied to the pushing operation section. This allows the lid body to be sufficiently rotated. Furthermore, the attachment cap according to the present invention has an air vent and thus allows contents in a container to be smoothly taken out.

Brief Description of the Drawings

[0011]

Figure 1A illustrates a state in which a conventional attachment cap with its lid closed is attached to a paper carton pack;

Figure 1B is a drawing for describing an operation of opening the lid of the conventional attachment cap;

Figure 2 is a drawing for schematically describing an operation of opening a lid of an attachment cap according to an embodiment of the present invention;

Figure 3A is a perspective view illustrating the attachment cap with its lid closed according to an embodiment of the present invention;

Figure 3B is a perspective view for describing an operation of opening the lid of the attachment cap according to an embodiment of the present invention;

Figure 3C is a perspective view illustrating a state in which the attachment cap according to an embodiment of the present invention completely opens its lid;

Figure 4A is a plan view of the attachment cap according to an embodiment of the present invention at the time of its formation;

Figure 4B is a side view of the attachment cap according to an embodiment of the present invention at the time of its formation;

Figure 4C is a bottom view of the attachment cap according to an embodiment of the present invention at the time of its formation;

Figure 5 is a sectional view along line A-A of Figure 4A illustrating the attachment cap according to an embodiment of the present invention;

Figure 6A is a plan view of a state of the attachment cap with its lid closed according to an embodiment of the present invention;

Figure 6B is a side view of a state of the attachment cap with its lid closed according to an embodiment of the present invention;

Figure 6C is a bottom view of a state of the attachment cap with its lid closed according to an embodiment of the present invention;

Figure 7 is a sectional view along line B-B of Figure 6A illustrating the attachment cap according to an embodiment of the present invention;

Figure 8A is a sectional view of the attachment cap for describing a state in which a lid body thereof is closed;

Figure 8B is a sectional view of the attachment cap for describing a state in which the lid body advances and a hook thereof is disengaged;

Figure 8C is a sectional view of the attachment cap for describing a state in which the lid body rotates;

Figure 8D is a sectional view for describing a state in which the lid body is completely opened;

Figure 9 is a sectional view for describing a state in which the lid body is maintained in a state in which the lid body completely stands up;

Figure 10 is a sectional view along line C-C of Figure 6A illustrating the attachment cap according to an embodiment of the present invention;

Figure 11 is a plan view of an attachment cap according to another embodiment of the present invention at the time of its formation;

Figure 12 is a sectional view along line D-D of Figure 11 illustrating the attachment cap according to the another embodiment of the present invention;

Figure 13 is a plan view of a state of the attachment cap with its lid closed according to the another embodiment of the present invention;

Figure 14 is a sectional view along line E-E of Figure 12 illustrating the attachment cap according to the another embodiment of the present invention; and

Figure 15 is a side view of a state of the attachment cap with its lid closed according to the another embodiment of the present invention.

Description of Symbols

[0012]

21	Container
22,31,44	Lid body
23,33,48	Pushing operation section
25,37,45,101	Pouring opening
26,49	Air vent
30,41,100	Attachment cap
32,42	Cap base
36,46	Cylindrical wall
39,57	Air vent plug section
43	Hinge section
50	Correction arm section
52,53,54,55	Bending section
56,102	Plug section
58	Receiving region

Best Mode for Carrying Out the Invention

[0013] As an embodiment of the present invention, an attachment cap attached to a paper carton pack will be described based on the drawings. The present attachment cap can be formed by injection molding using polypropylene, but may be formed integrally with a container thereof. Further, the following description is based on the assumption that the present attachment cap is attached to a paper carton pack, but it may be attached to a con-

tainer other than the paper carton pack such as a synthetic resin carton pack. Furthermore, the illustrated attachment cap is simplified in detail for ease of description and it should be noted that the size of the attachment cap is different from that of an actual attachment cap. Furthermore, the following description is based on the assumption that the present attachment cap is attached to a container containing a liquid or the like, but the attachment cap according to the present invention may be attached to a container containing powder or particles. Furthermore, the attachment cap may have one pouring opening or a plurality of pouring openings. It should be noted that throughout the drawings, like reference numerals or characters refer to like components for the sake of convenience.

[0014] Figure 2 is a perspective view for schematically describing an operation of opening a lid body 22 in a state in which an attachment cap 20 according to the present invention is attached to a paper carton pack 21. In a state in which the lid body 22 is closed, when a pushing operation section 23 of the attachment cap 20 is pushed down, the lid body 22 rotates in a direction indicated by an arrow 24. As a result, a pouring opening 25 opens and an air vent 26 opens as well. Since the air vent 26 opens, a liquid in the paper carton pack 21 can be smoothly taken out through the pouring opening 25.

[0015] Figures 3A, 3B, and 3C each is a perspective view for schematically describing an operation of an attachment cap 30 according to a first embodiment of the present invention. Figure 3A is a drawing illustrating a state in which a lid body 31 of the attachment cap 30 is closed. In this state, the lid body 31 is folded into a cap base 32 and a pouring opening is closed by the lid body 31. As described later, an air vent is also closed by an air vent plug section.

[0016] As illustrated in Figure 3B, when a pushing operation section 33 is pushed down in a direction indicated by an arrow 34, the lid body 31 rotates in a direction indicated by an arrow 35. As a result, the lid body 31 is disengaged from a cylindrical wall 36 and a pouring opening 37 opens. At the same time, an air vent 38 is released from an air vent plug section 39. When the pushing operation section 33 is completely pushed down, as illustrated in Figure 3C, the lid body 31 stands up substantially at a right angle with respect to the cap base 32. When the lid body 31 stands up, the lid body 31 is located on an upstanding section 40 of the cap base 32 and temporarily fixed thereto (described later). Therefore, a liquid in the container can be smoothly taken out through the pouring opening 37.

[0017] Next, the structure of the attachment cap according to the present invention will be described. Figures 4A, 4B, and 4C are a plan view, a side view, and a bottom view of an attachment cap 41 according to an embodiment of the present invention at the time of its formation respectively. Figure 5 is a sectional view along line A-A of Figure 4A. Hereinafter, by referring to these figures, the structure of the attachment cap 41 will be described.

[0018] The attachment cap 41 includes a cap base 42, a hinge section 43, and a lid body 44, which are integrally formed using a synthetic resin such as polypropylene. As illustrated in Figure 4A, the cap base 42 has a pouring opening 45 substantially at its center and a cylindrical wall 46 at its surrounding. It is desirable to form the cylindrical wall 46 into a shape allowing the contents to be easily taken out from the container. The cap base 42 further includes a receiving region 47 in a position adjacent to the hinge section 43. The region forms a region lower than its surrounding. As described later, the receiving region 47 forms a space for receiving a pushing operation section 48 when the pushing operation section 48 is pushed down. An air vent 49 is formed between the cylindrical wall 46 and the receiving region 47. The air vent 49 may pass air when a liquid or the like inside the container is taken out. Therefore, the air vent 49 may have a small diameter and may be formed in any position of the cap base 42.

[0019] The hinge section 43 includes the pushing operation section 48 and a correction arm section 50 formed on both sides of the pushing operation section 48 and parallel to the pushing operation section 48, each formed between the cap base 42 and the lid body 44. A gap 51 is provided between the pushing operation section 48 and the correction arm section 50. The pushing operation section 48 and the correction arm section 50 constitute a hinge mechanism. The hinge section 43 has a first bending section 52 and a second bending section 53 interposed between the cap base 42 and the hinge section 43. The hinge section 43 can rotate with the first and second bending sections 52 and 53 as its axis.

[0020] The lid body 44 is formed to be adjacently connected to the hinge section 43. The lid body 44 is coupled to the pushing operation section 48 through a third bending section 54 as well as to the correction arm section 50 through a fourth bending section 55. A plug section 56 is formed substantially at the center of the lid body 44 so as to be able to fit to the pouring opening 45 provided in the cap base 42 and seal the pouring opening 45. A protrusion shaped air vent plug section 57 is provided between the pushing operation section 48 and the plug section 56. The lid body 44 rotates with the third bending section 54 and the fourth bending section 55 as its axis.

[0021] Figures 6A, 6B, and 6C are a plan view, a side view, and a bottom view of the attachment cap 41 with its lid closed according to an embodiment of the present invention respectively. Figure 7 is a sectional view along line B-B of Figure 6A. The attachment cap 41 illustrated in Figure 6A is in a state in which the hinge section 43 of the attachment cap 41 in Figure 4A rotates with the first and second bending sections 52 and 53 as its axis; and the plug section 56 and the air vent plug section 57 of the lid body 44 are fit to the pouring opening 45 and the air vent 49 respectively. In Figure 7, a receiving region 58 is formed between the pushing operation section 48 and the cap base 42. When the pushing operation section 48 is pushed down, the pushing operation section 48

moves inside the receiving region 58 as described later.

[0022] Figures 8A, 8B, 8C, and 8D each are a sectional view for describing the operation that from a state in which the attachment cap 41 attached to a container 80 such as a paper carton pack closes its lid, the lid body 44 rotates until the pouring opening 45 is completely opened. Figure 8A illustrates a state in which the plug section 56 of the attachment cap 41 is fit to the pouring opening 45 to close the lid. In this state, as illustrated in Figure 8B, a pushing force is applied to the pushing operation section 48 in a direction indicated by an arrow 81, the bending section 53 slightly moves in a direction indicated by an arrow 82 and the pushing operation section 48 sinks into the receiving region 58. As a result, the plug section 56 and the air vent plug section 57 move upward from the pouring opening 45 and the air vent 49 respectively and the lid body 44 slightly advances in a direction indicated by an arrow 83 to disengage a hook section 84.

[0023] In a state in which the hook section 84 is disengaged, when a pushing force further continues to be applied to the pushing operation section 48, the pushing operation section 48 further sinks into the receiving region 58 as illustrated in Figure 8C. However, the correction arm section 50 prevents the lid body 44 from advancing and instead of advancing, the lid body 44 rotates in a direction indicated by an arrow 85 with the bending section 54 as its axis. When the pushing operation section 48 is further pushed down, the lid body 44 further continues rotating, and the lid body 44 reaches a substantially upstanding state as illustrated in Figure 8D. In this state, the lid body 44 is placed on the upstanding section 40 and the upstanding state is maintained.

[0024] Figure 9 is a sectional view for describing a state in which the lid body 44 is maintained in a state in which the pushing operation section 48 is pushed down into the receiving region 58 and the lid body 44 completely stands up. When the pushing operation section 48 is pushed down into the receiving region 58, the upstanding section 40 prevents the pushing operation section 48 from laterally moving and the tensile force of the correction arm section 50 causes the lid body 44 to rotate and finally reach a completely upstanding state. When the pushing operation section 48 is pushed down into the receiving region 58 by a pushing operation, an end section 59 of the bending section 54 on the pushing operation section 58 side contacts a wedge-shaped upstanding side surface 60 from a bottom section 47 and an end section 61 on the lid body 44 side is located on an upper surface of the upstanding section 40 of the cap base 32. In this state, the lateral and upward movements of the lid body 44 are restricted and the lid body 44 maintains the state of standing up on the upper surface of the upstanding section 40 of the cap base 32. As a result, in a state in which the pushing operation section 48 is press-contacted to the upstanding section 40, the lid body 44 adjacently connected to the pushing operation section 48 is held standing up.

[0025] Figure 10 is a sectional view along line C-C of

Figure 6A. When the attachment cap 41 is closed, each correction arm section 50 placed side by side to the pushing operation section 48 is located on a ledge section 62 formed on the cap base 32. As illustrated in the figure, an angle 63 contacting the cap base 32 of the correction arm section 50 is formed into an acute angle slightly less than 90 degrees. When the lid body 44 rotates in a state in which the pushing operation section 48 is pushed down into the receiving region 58, the correction arm section 50 formed (into a wedge-shape) in this manner can prevent the correction arm section 50 from lifting upward from the ledge section 62. Thus, the lid body 44 can smoothly rotate.

[0026] Thus, the attachment cap according to the first embodiment allows the pouring opening to be opened simply by pushing the pushing operation section of the attachment cap by a single push and the contents in the paper carton pack to be easily poured out. Further, the receiving region into which the pushing operation section is pushed down can be formed shallow, and thus the attachment cap can be formed thin and does not require a large space on the upper portion of the paper carton pack to be attached thereto. Furthermore, a cylindrical wall is provided around the pouring opening, and thus the contents in the paper carton pack can be smoothly guided in a specific direction by designing the cylindrical wall into a desired shape.

[0027] Figure 11 is a plan view of an attachment cap 100 according to a second embodiment of the present invention at the time of its formation. Figure 12 is a sectional view along line D-D of Figure 11. The attachment cap 100 according to the second embodiment has the same structure as the attachment cap 41 according to the first embodiment except the shapes of a pouring opening 101 and a plug section 102. The pouring opening 101 does not have a cylindrical wall such as the one in the first embodiment and is formed to be tightly fit to the plug section 102 for sealing.

[0028] Figure 13 is a plan view of a state of the attachment cap 100 with its lid folded according to the second embodiment of the present invention. Figure 14 is a sectional view along line E-E of Figure 13. As understood from the sectional view of Figure 14 and the side view of Figure 15, the attachment cap of the second embodiment does not have a cylindrical wall around the pouring opening 101, and thus the attachment cap 100 can be formed thinner than the attachment cap 41 of the first embodiment.

Industrial Applicability

[0029] Attachment of the attachment cap according to the present invention to a container containing drinking water, juice, or the like allows the content to be poured out by single push. Further, a thin attachment cap can be formed and thus is convenient for storing, transporting, and using the container to which the attachment cap is attached. Furthermore, the attachment cap according

to the present invention can be used for a container containing powder or particles, and can be formed to have a plurality of pouring openings. It should be understood that all of the above configurations should be included in the claims according to the present invention.

Claims

1. An integrally formed attachment cap attached to a container in order to take out contents in the container and allowing its lid to be opened and closed by a single push, the integrally formed attachment cap comprising:

a cap base having a pouring opening for taking out the contents, an attachment surface of the cap base being attached to the container;
 a hinge section including a pushing operation section rotatably connected adjacently to one end of the cap base and a correction arm section formed spaced apart from and parallel to the pushing operation section; and
 a lid body rotatably connected adjacently to the other end of the pushing operation section and the correction arm section and having a plug section for sealing the pouring opening, wherein the cap base has a receiving region capable of receiving the pushing operation section on an upper surface of the cap base facing an attachment surface of the cap base; a bottom surface of the receiving region is formed lower than the surface on which the correction arm section abuts against the upper surface; and in a state in which the pouring opening is sealed by the plug section, when the pushing operation section is pushed out into the receiving region, the lid body rotates to release the plug section from the pouring opening.

2. The integrally formed attachment cap according to claim 1, wherein the correction arm section is formed spaced apart from and parallel to both sides of the pushing operation section.

3. The integrally formed attachment cap according to claim 1, wherein a sectional side of the correction arm section contacting the cap base is formed flared such that when a pushing operation is performed, the correction arm section always contacts a lower portion of the cap base, thereby preventing lifting upward.

4. The integrally formed attachment cap according to claim 1, further comprising a cylindrical wall around the pouring opening.

5. The integrally formed attachment cap according to

claim 1, wherein the plug section has a protruding section fit into the pouring opening.

6. The integrally formed attachment cap according to claim 1, further comprising a hook section for temporarily fixing the lid body to the cap base.

7. The integrally formed attachment cap according to claim 1, wherein the attachment cap is integrally formed of a synthetic resin.

8. The integrally formed attachment cap according to claim 1, wherein the cap base has an air vent for passing air into the container and the lid body has an air vent plug section for closing the air vent when the lid body is completely closed.

9. The integrally formed attachment cap according to claim 1, wherein when the pushing operation section is pushed down into the receiving region by a pushing operation, an end section on a pushing operation section side in a bending section formed between the pushing operation section and the lid body contacts a wedge-shaped side surface in an upstanding section of the cap base from a bottom section in the receiving region, an end section on the lid body in the bending section is located on an upper surface of the upstanding section of the cap base, and thereby the lid body maintains a state of standing up on the upper surface of the cap base.

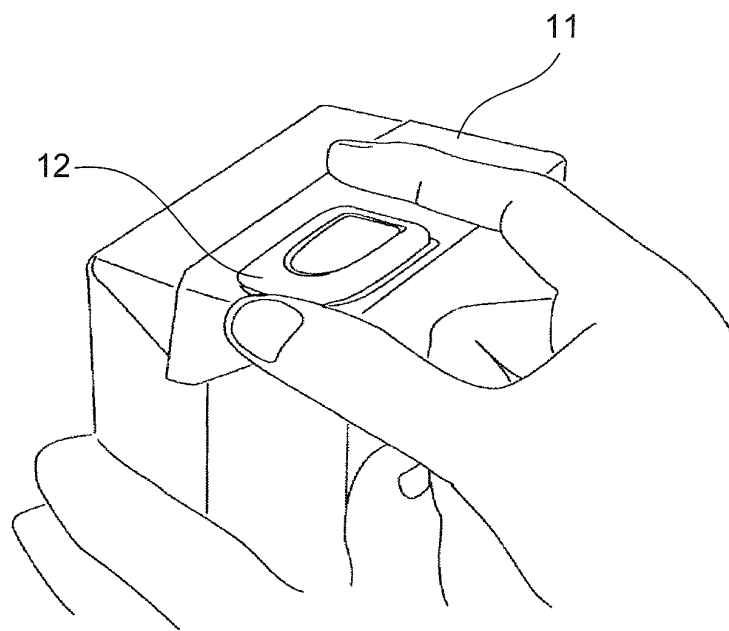


Fig. 1A

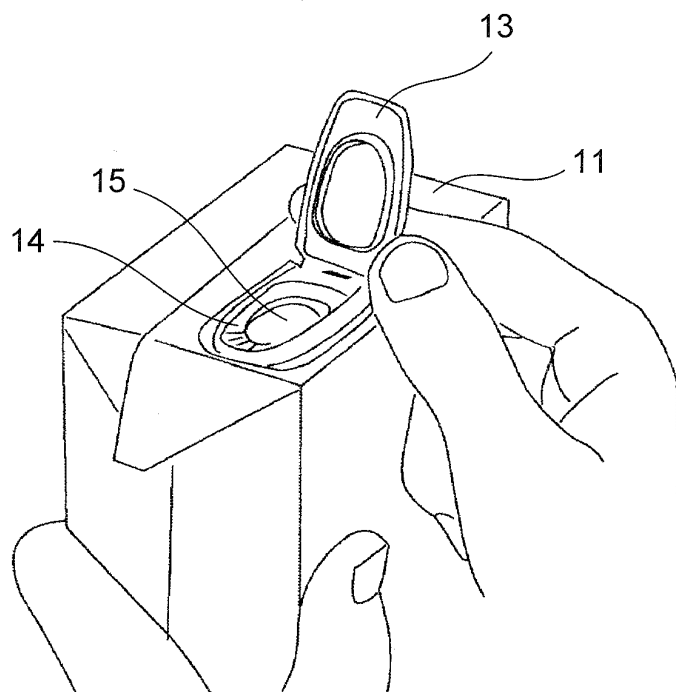


Fig. 1B

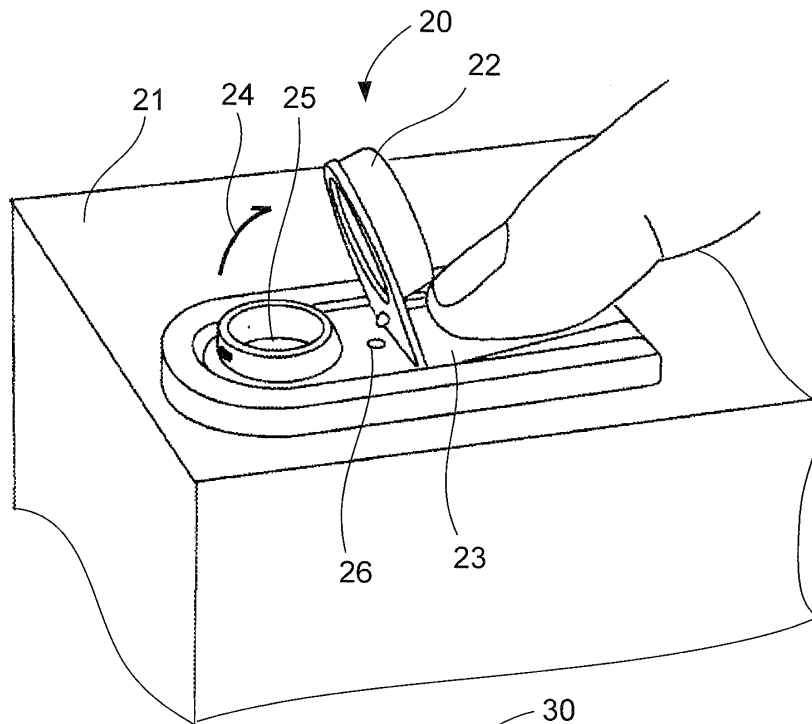


Fig. 2

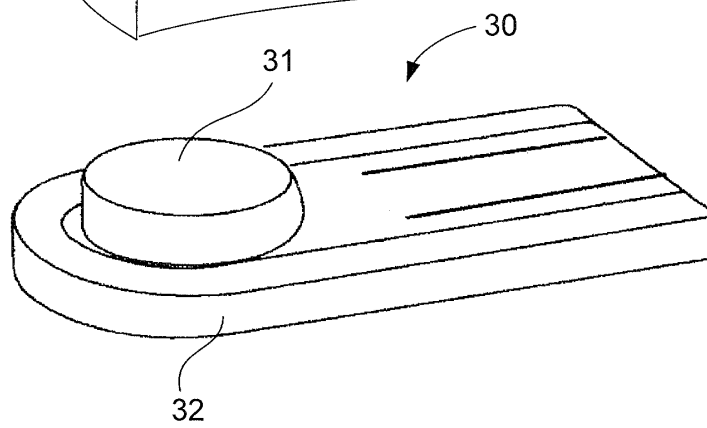


Fig. 3A

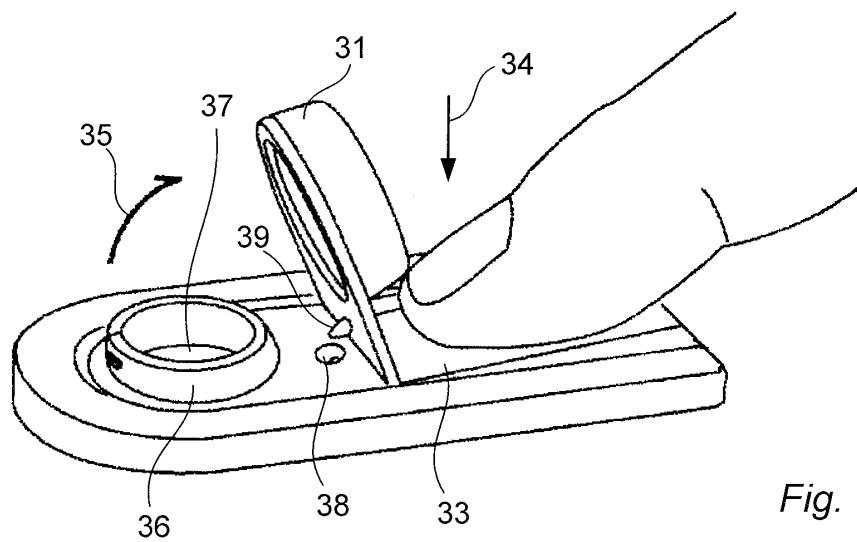


Fig. 3B

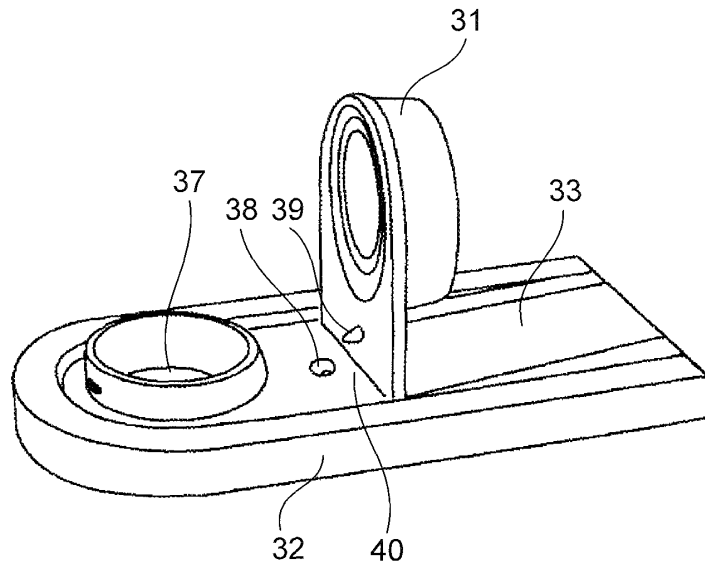


Fig. 3C

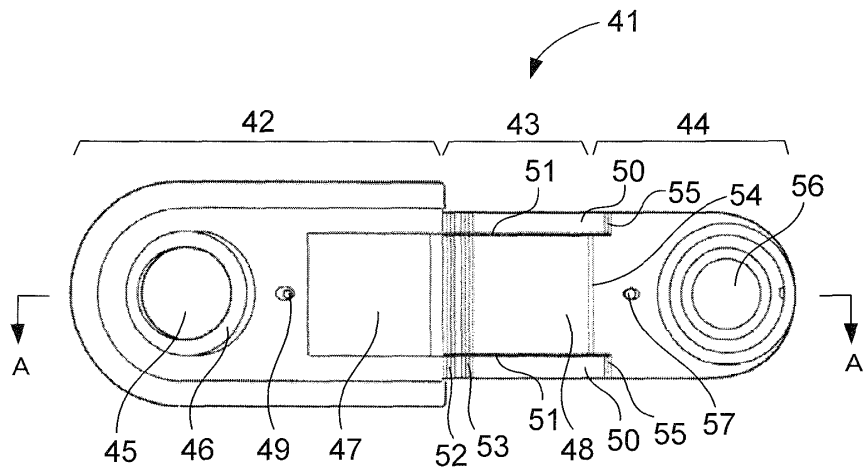


Fig. 4A

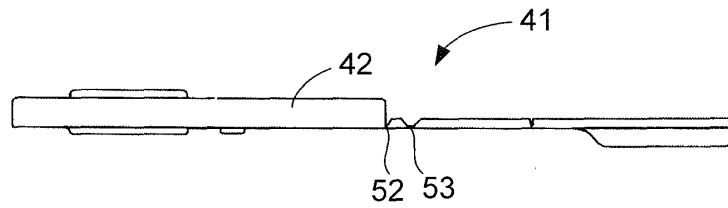


Fig. 4B

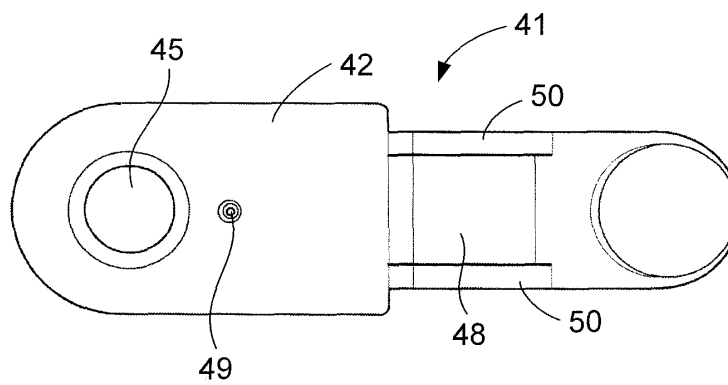
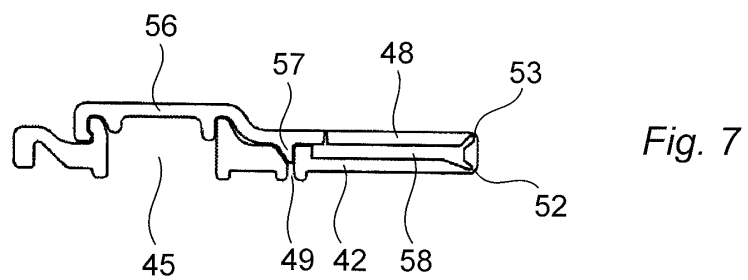
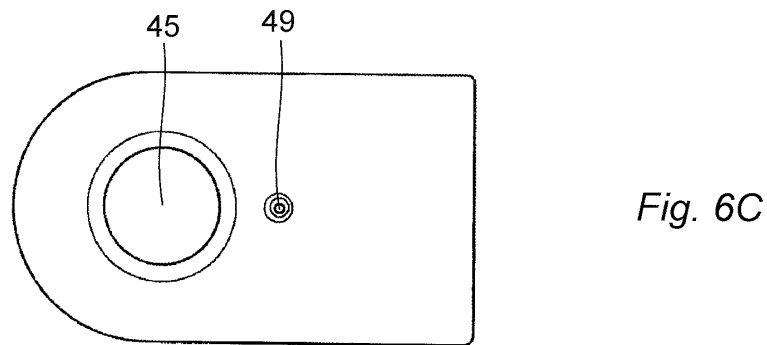
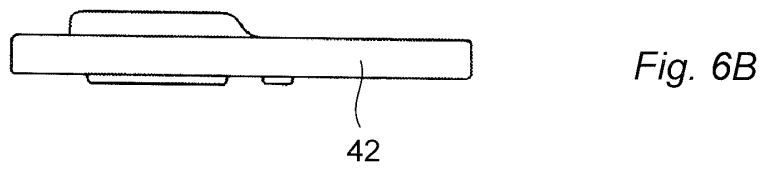
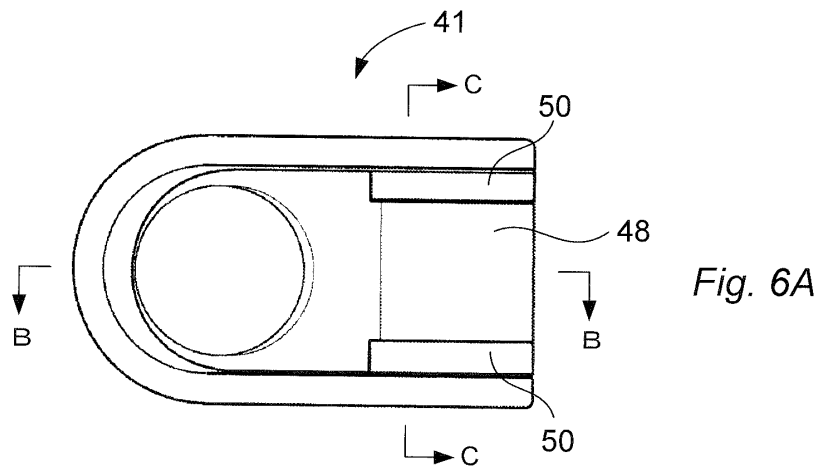
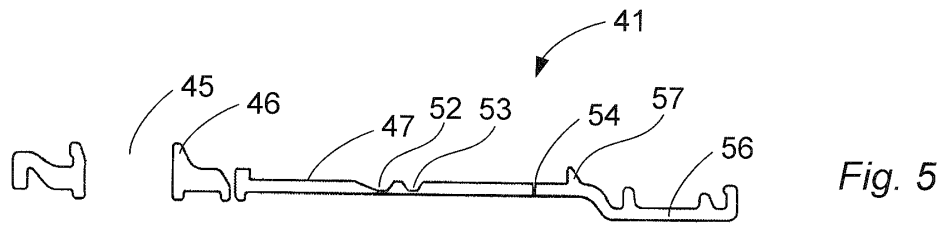


Fig. 4C



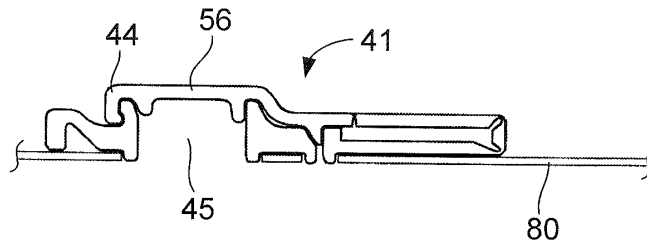


Fig. 8A

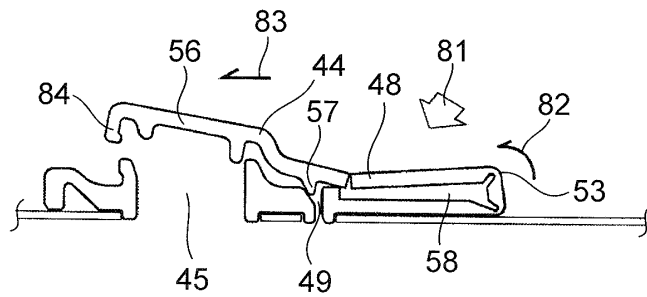


Fig. 8B

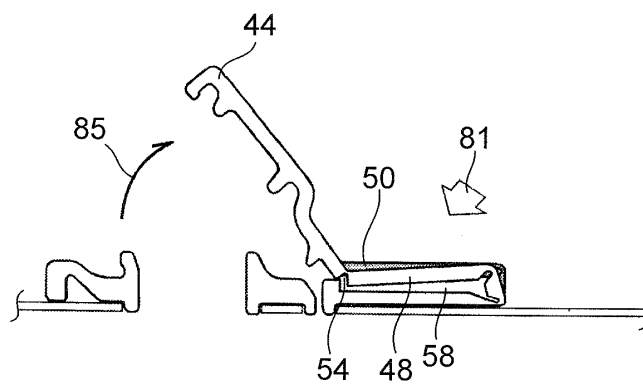


Fig. 8C

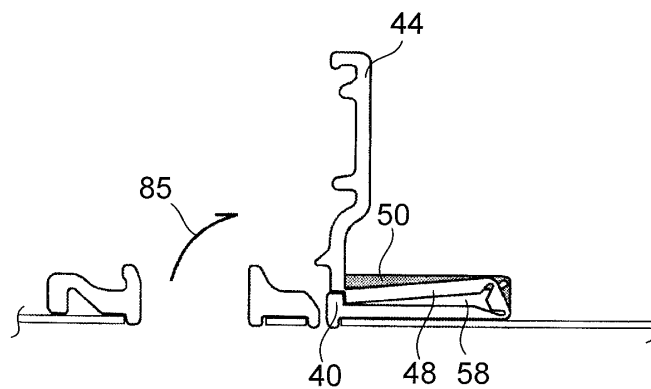


Fig. 8D

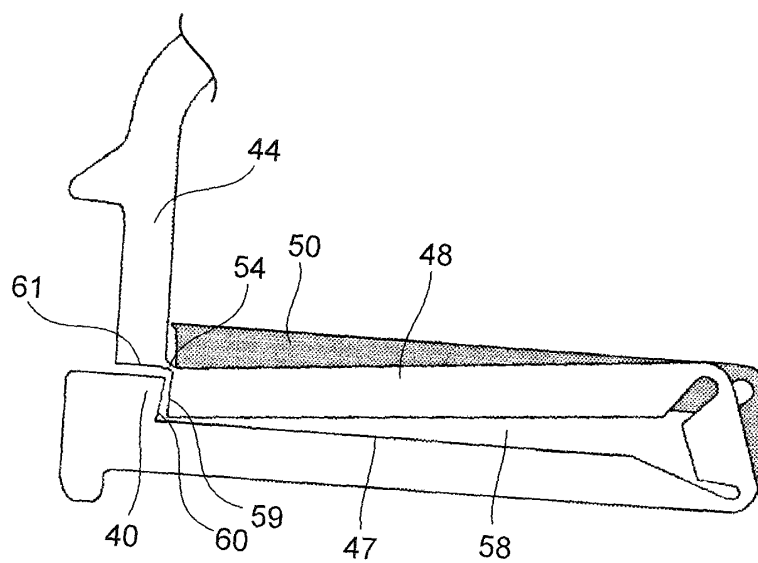


Fig. 9

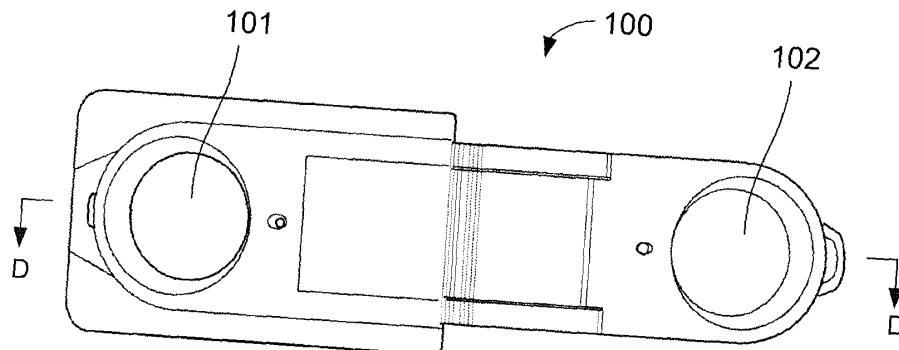


Fig. 11

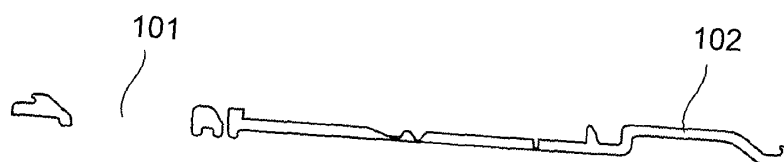
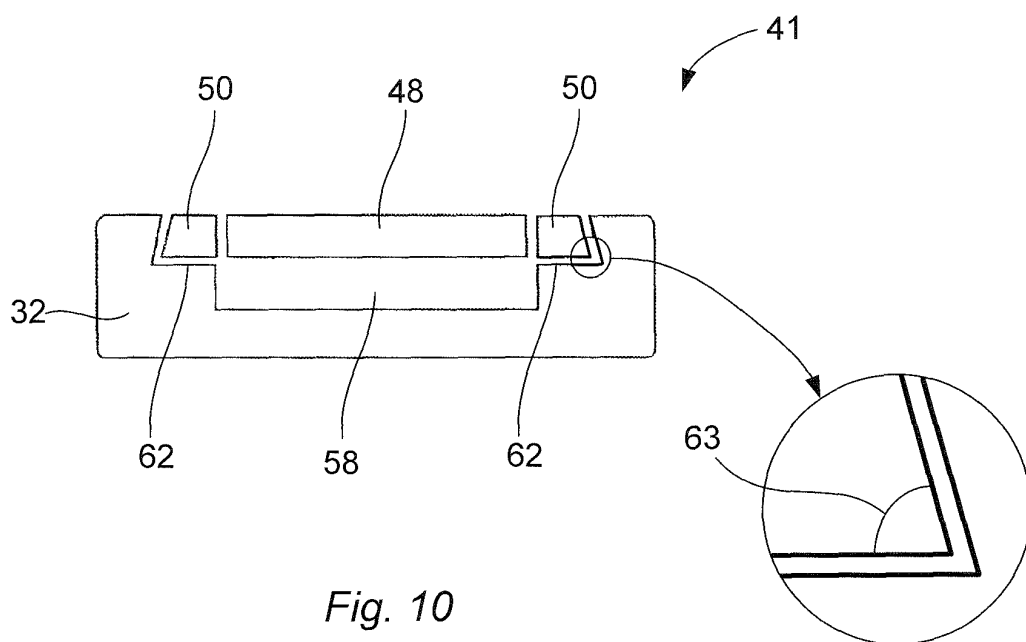


Fig. 12



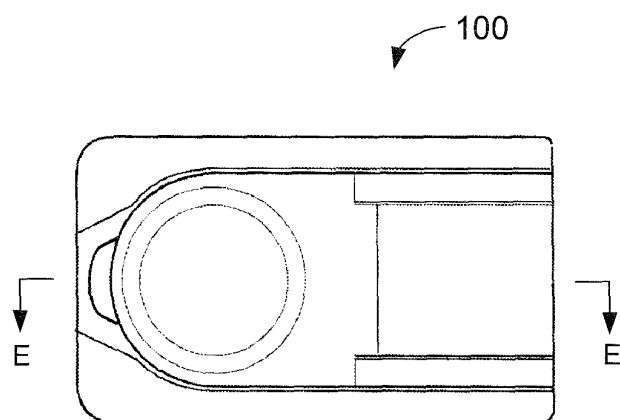


Fig. 13

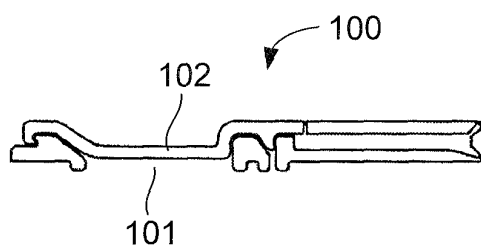


Fig. 14

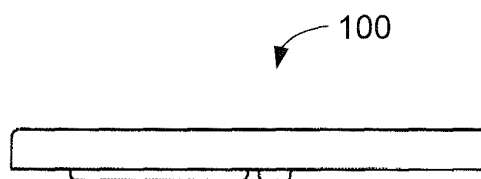


Fig. 15

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2008/001375

A. CLASSIFICATION OF SUBJECT MATTER B65D47/08 (2006.01) i, B65D5/74 (2006.01) i		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) B65D47/08, B65D5/74		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Jitsuyo Shinan Koho 1922-1996 Jitsuyo Shinan Toroku Koho 1996-2008 Kokai Jitsuyo Shinan Koho 1971-2008 Toroku Jitsuyo Shinan Koho 1994-2008		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y A	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 123871/1982 (Laid-open No. 052141/1983) (Toyo Kogei Kogyo Inc.), 08 April, 1983 (08.04.83), Full text; Figs. 1 to 3 (Family: none)	1-2, 4-8 3, 9
Y A	JP 10-338256 A (Hiroshi YOSHIHARA), 22 December, 1998 (22.12.98), Full text; Figs. 1 to 8 & WO 1998/055371 A1	1-2, 4-8 3, 9
☒ Further documents are listed in the continuation of Box C. ☐ See patent family annex.		
* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "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) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "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 "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 "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 "&" document member of the same patent family		
Date of the actual completion of the international search 19 August, 2008 (19.08.08)		Date of mailing of the international search report 02 September, 2008 (02.09.08)
Name and mailing address of the ISA/ Japanese Patent Office		Authorized officer
Facsimile No.		Telephone No.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2008/001375

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	JP 1-279064 A (Masaaki HAGA), 09 November, 1989 (09.11.89), Page 1, lower left column, lines 5 to 11; Fig. 1 (Family: none)	8

Form PCT/ISA/210 (continuation of second sheet) (April 2007)

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 5730310 A [0003] [0005]