



(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 158(3) EPC

(43) Date of publication:
19.11.2003 Bulletin 2003/47

(51) Int Cl.7: **B65D 83/00, B65D 77/28**

(21) Application number: **02703862.9**

(86) International application number:
PCT/JP02/01488

(22) Date of filing: **20.02.2002**

(87) International publication number:
WO 02/066340 (29.08.2002 Gazette 2002/35)

(84) Designated Contracting States:
**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE TR**

- **KANDA, Hiroshi, c/o Kikkoman Corporation**
Noda-shi, Chiba 278-8601 (JP)
- **UDA, Yuji, c/o Gold Pak Co., Ltd.**
Shibuya-ku, Tokyo 150-0043 (JP)

(30) Priority: **21.02.2001 JP 2001045127**

- (71) Applicants:
- **KIKKOMAN CORPORATION**
Noda-shi, Chiba 278-8601 (JP)
 - **Gold Pak Co., Ltd.**
Shibuya-ku, Tokyo 150-0043 (JP)

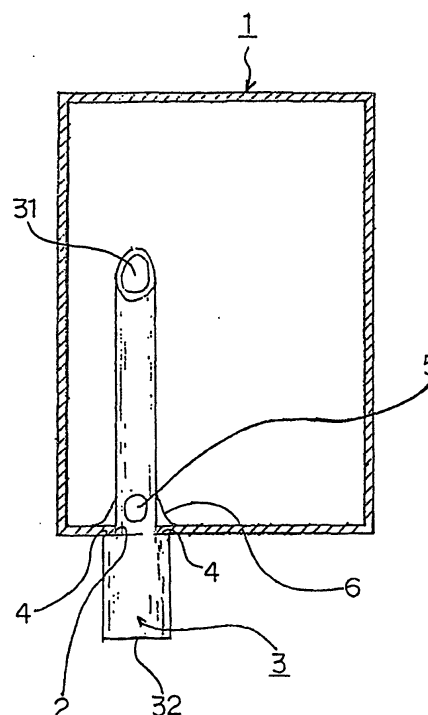
- (74) Representative:
- Forstmeyer, Dietmar, Dr. rer. nat., Dipl.-Chem. et al**
Patentanwaltskanzlei Dr. Dietmar Forstmeyer,
Bereiteranger 15
81541 München (DE)

- (72) Inventors:
- **KUWAGAKI, Denmi, c/o Kikkoman Corporation**
Noda-shi, Chiba 278-8601 (JP)

(54) **STRAW**

(57) The straw according to the present invention is a straw 3 adapted to be removably inserted into a press deformable container 1 through a straw insert opening 2 of the container 1, which is characterized by having a stopping part 4 for stopping itself from being inserted through the straw insert opening 2 and an inlet hole 5 at a position distant from the position of the stopping part 4 by a distance substantially equal to the thickness W of the container-forming material having the straw insert opening 2.

Fig. 2



Description

Technical Field:

[0001] The present invention relates to a straw which is removably inserted into a press-deformable container, such as a paper carton, containing a liquid food, e. g., beverages, noodle sauces or dips for grilled beef, and used to pour the liquid food. More particularly, it relates to a straw which easily pours the liquid food to the last drop, does not drip, is hygienic because the outer periphery of the opening thereof is hardly contaminated, and enables re-closing of the container.

Background Art:

[0002] It is common that a straw is removably inserted into a paper carton through a straw insert opening of the carton to drink a liquid food. When a liquid food in such a paper carton is dispensed or transferred into another container such as a dish or a cup, it is generally difficult to do this through the straw. Then a liquid food is usually dispensed or transferred into another container by cutting off a corner of the paper carton to make a pour opening and pouring the liquid food through the opening.

[0003] However, the opening made in this way drips or dribbles down, and its outer periphery is easily contaminated, which is hygienically problematic. Besides, because such an opening is larger than an opening designed for straw insertion, it is difficult to re-close the paper carton, and preservability of the liquid food is deteriorated.

[0004] JP-U-64-39253 discloses a pouch which has a straw type pour spout and is adapted to be filled with a beverage (see Fig. 1 of the official gazette). Because this pour spout is not removable but integral with the pouch, it is not reapplicable to other containers.

Disclosure of the Invention:

[0005] An object of the present invention is to provide a straw which is removably inserted into a container filled with a liquid food, easily pours the liquid food to the last drop, does not drip, is hygienic because the outer periphery of its opening is hardly contaminated, and enables re-closing of the container.

[0006] The present invention accomplishes the above object by providing a straw 3 adapted to be removably inserted into a press-deformable container 1 through a straw insert opening 2 of the container 1, which is characterized by having a stopping part 4 for stopping itself from being inserted through the straw insert opening 2 and an inlet hole 5 at a position distant from the position of the stopping part 4 by a distance substantially equal to the thickness W of the container-forming material having the straw insert opening 2.

[0007] The present invention also accomplishes the above object by providing a straw adapted to be remov-

ably inserted into a press-deformable container 1 through an insert opening 2 of the container 1, which is characterized by comprising an outer tube 3a, a middle tube 3b, and an inner tube 3c, the middle tube 3b and the inner tube 3c being fitted into the outer tube 3a slidably in their longitudinal direction, the outer tube 3a having a stopping part 4 for stopping itself from being inserted through the insert opening 2 and an inlet hole 5 at a position distant from the position of the stopping part 4 by a distance substantially equal to the thickness W of the container-forming material having the straw insert opening 2, and the inlet hole 5 being opened and closed by sliding at least the middle tube 3b.

15 Brief Description of the Drawings:

[0008]

Fig. 1 is a schematic cross-section of a straw according to a first embodiment.

Fig. 2 is a schematic view of the straw of the first embodiment inserted into a paper carton which is cross-cut.

Figs. 3(a) and 3(b) show a straw according to a second embodiment and correspond to Fig. 1.

Figs. 4(a) and 4(b) show a straw according to a third embodiment and correspond to Fig. 2.

Figs. 5(a) and 5(b) show a straw according to a fourth embodiment and correspond to Fig. 2.

Fig. 6 represents schematic cross-sections of stopping parts according to other embodiments.

Fig. 7 schematically illustrates an embodiment of the present invention, in which a straw has a flexible section (bellows).

Best Mode for Carrying out the Invention:

[0009] The straw of the present invention will be described based on its preferred embodiments with reference to the accompanying drawings.

[0010] As shown in Figs. 1 and 2, a straw 3 according to the first embodiment is a hollow, small-diametered tube having a circular cross-section which is adapted to be inserted into a press-deformable container 1 (e.g., a paper carton) filled with a liquid food (not shown) through a straw insert opening 2 of the container 1. Similarly to an ordinary straw, the straw 3 provides a passageway for liquid extending in the longitudinal direction thereof and has its both ends open to form a suction inlet 31 and a pour outlet 32. The straw 3 has its suction inlet 31 side end cut aslant to make a sharp tip.

[0011] The straw 3 of the first embodiment has a stopping part 4 for stopping itself from being completely inserted through the insert opening 2. The stopping part 4 is a shoulder formed in the middle of the straw 3. The stopping part 4 is formed by making the section nearer to the pour outlet 32 (the section sticking out of the paper carton 1 when the straw 3 is inserted through the insert

opening 2) larger in diameter than the insert opening 2 while making the rest of the straw 3 (the section inserted into the paper carton 1) almost equal in diameter to the straw insert opening 2.

[0012] The straw 3 of the first embodiment has a circular inlet hole or holes 5 connecting to the passageway at a position distant from the position of the stopping part (the shoulder) 4 by a distance substantially equal to the thickness W of the container-forming material having the straw insert opening 2 (the depth of the insert opening 2). Specifically, the distance that is substantially equal to the thickness W is (W+0.5 to 4.0) mm, preferably (W+1.0 to 2.0) mm.

[0013] The number of the inlet holes is preferably 2 or 3. As shown in Figs. 1 and 2, the inlet hole 5 is preferably a hole previously made. The straw 3 before use may have easy-to-tear perforations (not shown for the sake of simplicity of drawing) along the shape of an inlet hole 5 instead of a previously made hole. On use, the part surrounded by the perforations is torn off or pressed in to make an inlet hole 5.

[0014] The straw 3 of the first embodiment is used as follows. A paper carton 1 is placed straight up. A sealing piece (not shown) covering the upper face of the insert opening 2 is removed to expose a synthetic resin (plastic) film 6 (see Fig. 2) covering the insert opening 2. The sharp edge of the suction inlet 31 of the straw 3 is pressed to poke the film 6, and the straw 3 is inserted until the surface of the stopping member 4 (the shoulder) comes into contact with the periphery surrounding the insert opening 2.

[0015] The paper carton 1 having the straw 3 inserted therein through the insert opening 2 is held upside down as illustrated in Fig. 2 with the pour outlet 32 of the straw 3 directed to a container (not shown) into which the liquid food is to be dispensed or transferred. In this state the outer wall of the straw 3 nearby the insert opening 2 is provided with a liquid-tight seal by the inner wall of the insert opening 2 and the film 6 so that the straw 3 may not come off the insert opening 2. The liquid food in the paper carton 1 spontaneously flows by its own weight through the inlet holes 5 and the suction inlet 31 into the passageway and pours from the pour outlet 32 into the container. Where the paper carton 1 is shape restorable, it is preferred if needed that the paper carton 1 be squeezed with fingers from its both sides in the state shown in Fig. 2 to deform the paper carton 1 thereby to help the liquid food pour smoothly.

[0016] When the whole amount of the liquid food does not need to be transferred, the paper carton 1 is turned up, and the straw 3 is pulled out of the paper carton. In the next occasion of pouring, the above-described operation is repeated.

[0017] The straw 3 according to the first embodiment produces the following effects (1) to (7).

1) The straw 3 is able to be repeatedly inserted and removed to stably pour a liquid food, such as noodle

sauce, dip for grilled beef, Worcester sauce, ketchup or a drink, from a paper carton to the last drop by spontaneous pour with, if needed, pressing both sides of the paper carton with fingers.

2) The straw is hygienic because the pour outlet 32 does not drip or dribble so that the outer periphery of its opening is hardly contaminated. After the straw 3 is pulled out, since the hole left in the insert opening 2 is very small, it is possible to reclose the paper carton 1 by covering the hole with a sealing piece, etc. so as to protect the contents against rapid deterioration in quality.

3) Because the inside of the paper carton 1 is kept under negative pressure during pouring, the straw 3 enables sharp cutting of the pour at the end of dispensing.

4) The straw 3 is useful as an ordinary one to drink a liquid food in the paper carton 1. It ensures easy drinking because of the inlet hole 5 in addition to the suction inlet 31.

5) The straw 3 can be designed to smoothly pour any fluids of different viscosities or physical properties by properly adjusting the size of the inlet hole 5.

6) Even if a paper carton 1 is laid down on its side, a liquid food does not flow out because for one thing the inside of the paper carton is under negative pressure and, for another, the outer wall of the straw 3 nearby the insert opening 2 and the inner wall of the insert opening 2 are kept liquid-tight.

7) The straw 3 is applicable to a diversity of packages from small (50 ml) to large (1000 ml) and of paper or plastics to exert the same effects.

[0018] Fig. 3 represents schematic cross-sections illustrating a straw according to the second embodiment. The same elements as in the first embodiment are given the same reference characters. Fig. 3(a) shows the straw of the second embodiment inserted into a paper carton 1 through an insert opening 2 of the carton 1. Fig. 3(b) shows the straw pulled out from the state shown in Fig. 3(a) until the inlet holes 5 come out of the paper carton 1.

[0019] The second embodiment has the same configuration as the first one except that the suction inlet 31 of the first one is replaced with a closed end 7. The second embodiment produces the following effect in addition to the effects of the first embodiment. The fluid food in the paper carton 1 can be shielded from the outside air to keep freshness for an extended period of time simply through an easy operation without using a seal for reclosing. That is, the paper carton 1 can be reclosed (the outside air is shut out) simply by pulling up the straw

3 until the inlet holes 5 come out of the paper carton 1 as illustrated in Fig. 3(b). As a result, the residual liquid food, being protected from bacterial contamination, is kept hygienic to have improved preservability. This feature is of great significance particularly for seasoning liquids such as noodle sauce, dip, and soy sauce, which could be a good source of nutrition for bacteria. Where left to stand in open air, such liquid foods are liable to undergo deterioration in quality and taste (putrefaction) by bacteria.

[0020] Fig. 4 provides schematic partial cross-sections of a straw according to the third embodiment inserted into a paper carton 1. The same elements as in the first embodiment are given the same reference characters. The third embodiment enables pouring and drinking through a single straw. As shown in Fig. 4, the straw is composed of an outer tube 3a having a stopping part 4 and a single inlet hole 5 and an inner tube 8 which is rotatably fitted into the outer tube 3a. The inner tube 8 has an inner hole 9 slightly smaller than the inlet hole 5 at a position distant from the position of the stopping part 4 by a distance substantially equal to the thickness W.

[0021] According to the third embodiment, when a liquid food in the paper carton 1 is poured into another container, the outer tube 3a and/or the inner tube 8 are relatively turned to interconnect the inner hole 9 and the inlet hole 5 as shown in Fig. 4(a), and the straw is used in the same manner to produce the same effects as in the first embodiment. When the liquid food is sucked through the straw, the outer tube 3a and/or the inner tube 8 are relatively turned to slide the inlet hole 5 away from the inner hole 9 to block the inlet hole 5 by the wall of the inner tube 8, and then the straw is used in an ordinary manner.

[0022] Fig. 5 shows schematic partial cross-sections of a straw according to the fourth embodiment inserted into a paper carton 1. The same elements as in the first embodiment are given the same reference numbers. The fourth embodiment enables pouring and drinking through a single straw similarly to the third embodiment. The fourth embodiment is a so-called telescopic straw (a multi-tube straw having a outer tube and an inner tube slidable in the outer tube). As shown in Fig. 5, the fourth embodiment comprises an outer tube 3a, a middle tube 3b, and an inner tube 3c. The middle tube 3b and the inner tube 3c are fitted into the outer tube 3a longitudinally slidably. The outer tube 3a has a stopping part 4 and an inlet hole 5 at a position distant from the position of the stopping part 4 by a distance substantially equal to the thickness W.

[0023] When a liquid food in the paper carton 1 is poured into another container by use of the straw of the fourth embodiment, the middle tube 3b is slid in the direction indicated by the arrow (downward in Fig. 5(a)) to open the inlet hole 5 as shown in Fig. 5(a). The straw is then used in the same manner as in the first embodiment to produce the same effects as enjoyed in the first

embodiment. When the liquid food is sucked through the straw, the middle tube 3b is slid in the direction indicated by the arrow (upward in Fig. 5(b)) (the inner tube 3c is slid downward) to block the inlet hole 5 by the wall of the middle tube 3b as shown in Fig. 5(b), and the straw is used in an ordinary manner.

[0024] The present invention will now be illustrated in greater detail with reference to Example and Test Example demonstrating the effects of the invention, but it should be understood that the invention is not construed as being limited thereto.

EXAMPLE

[0025] As a working example of the invention, a plastic straw having the same shape as the straw 3 shown in Fig. 1 was made. This straw had a total length of 80 mm. A 57 mm long section from the tip of the suction inlet 31 (the section to be inserted into a container) was a cylindrical tube having an outer diameter of 5 mm; a section from 57 mm to 80 mm away from that tip (the section adapted to stick out of the container) was a cylindrical tube having an outer diameter of 6 mm. The joint between these two tubes different in diameter was a stopping part (shoulder) 4. The straw had two inlet holes 5 having a diameter of 2 mm facing each other at a position about 2 mm distant from the position of the stopping part 4, the distance being substantially the same as the thickness W of the container-forming material having the insert opening 2.

COMPARATIVE EXAMPLE

[0026] For comparison, a straw having the same shape as the straw of Example except for having no inlet hole 5 was made.

TEST EXAMPLE

[0027] Two commercially available paper cartons containing 200 ml of milk and having an opening for straw insertion were prepared. Before poking with a straw, the opening for straw insertion was covered with a film, and the upper side of the opening was sealed with a sealing piece.

[0028] The two paper cartons were placed straight up, and each of the straws of Example and Comparative Example was inserted through the insert opening. The wall of the straw was kept liquid-tight by the inner wall of the insert opening and the film.

[0029] The paper cartons were held inverted with the pour outlet 32 down as shown in Fig. 2, and pouring milk was received by a cup. As a result, the straw of Example enabled efficient emptying of the carton to the last drop. The straw of Comparative Example, on the other hand, had to be drawn until the suction inlet 31 came down near the insert opening as the residual amount of milk decreased. Being drawn to such a degree, the straw

was so unstable that it was apt to come off the container to cause milk to splash out of the carton. It was impossible with the comparative straw to completely empty the carton to the last drop of milk.

[0030] From these results, it is understood that the straw of the present invention enables easy pouring the fluid and complete emptying of a container without splashing the fluid out of the container notwithstanding its extremely simple structure.

[0031] The straw of the present invention is not construed as being limited to the aforementioned embodiments, and various modifications can be made without departing from the spirit and scope of the present invention.

[0032] For example, the stopping part 4 is not particularly limited in shape as long as it is capable of stopping insertion of the straw 3 through the insert opening 2. That is, the shape of the stopping part 4 includes not only the shoulder shown in Fig. 6(d), which is adopted in the aforementioned embodiments, but a snap fit shown in Fig. 6(a), a groove fit shown in Fig. 6(b), a stop collar shown in Fig. 6(c), and a protrusion shown in Fig. 6(e). Of these shapes the snap fit of Fig. 6(a) and the groove fit of Fig. 6(b) are effective in preventing fall-off of the straw through the insert opening.

[0033] The inlet hole 5 is not particularly limited in number and shape as long as it is distant from the position of the stopping part 4 by a distance substantially equal to the thickness W of the container-forming material having the insert opening 2 (the depth of the insert opening 2).

[0034] A part or the whole length of the section between the stopping part 4 and the pour outlet 32 may be bellows 10. The bellows 10 render the straw extensible and flexible and enable arbitrary positioning of the pour outlet 32 of the straw. This will make it easier to transfer or dispense the fluid food of the container 1 into another container or to drink the fluid food through the straw.

Industrial Applicability:

[0035] Simply inserted into a container filled with a fluid food, the straw of the present invention enables pouring the fluid food to the last drop, does not drip, prevents the outer periphery of its open end from being contaminated to keep the hygiene, and enables easy re-closure of the container.

[0036] Where the straw has a two- or three-tube structure, it is made capable of opening and closing its connecting hole and enables both pouring and drinking with only this straw.

Claims

1. A straw 3 adapted to be removably inserted into a press deformable container 1 through a straw insert opening 2 of the container 1, which is **character-**

ized by having a stopping part 4 for stopping itself from being inserted through the straw insert opening 2 and an inlet hole 5 at a position distant from the position of the stopping part 4 by a distance substantially equal to the thickness W of the container-forming material having the straw insert opening 2.

2. The straw according to claim 1, **characterized by** having tear-out perforations at a position distant from the stopping part 4 by said distance, the part surrounded by the tear-out perforations being adapted to be torn out to make the inlet hole 5.

3. The straw according to claim 1, **characterized in that** the longitudinal end thereof which is adapted to be inserted into the container 1 is a closed end 7.

4. The straw according to claim 1, **characterized by** having at least one inner tube 8 fitted therein rotatably and longitudinally slidably, the inner tube 8 being adapted to be slid or rotated to open and close the inlet hole 5.

5. The straw according to claim 4, **characterized in that** the inner tube 8 has an inner hole 9 at a position distant from the position of the stopping part 4 by said distance and is adapted to be rotated to interconnect the inner hole 9 and the inlet hole 5.

6. The straw according to claim 1, wherein the stopping part 4 is a snap fit part, a groove fit part, a stop collar, a shoulder or a protrusion

7. The straw according to claim 1, wherein a part of or the whole of the section between the stopping part 4 and the pour outlet 32 is bellows 10.

8. A straw 3 adapted to be removably inserted into a press-deformable container 1 through a straw insert opening 2 of the container 1, which is **characterized by** comprising an outer tube 3a, a middle tube 3b, and an inner tube 3c, the middle tube 3b and the inner tube 3c being fitted into the outer tube 3a longitudinally slidably, the outer tube 3a having a stopping part 4 for stopping itself from being inserted through the straw insert opening 2 and an inlet hole 5 at a position distant from the position of the stopping part 4 by a distance substantially equal to the thickness W of the container-forming material having the straw insert opening 2, and the inlet hole 5 being opened and closed by sliding at least the middle tube 3b.

9. The straw according to claim 8, wherein the stopping part 4 is a snap fit part, a groove fit part, a stop collar, a shoulder or a protrusion

10. The straw according to claim 8, wherein a part of or

the whole of the section between the stopping part
4 and the pour outlet 32 is bellows 10.

5

10

15

20

25

30

35

40

45

50

55

Fig. 1

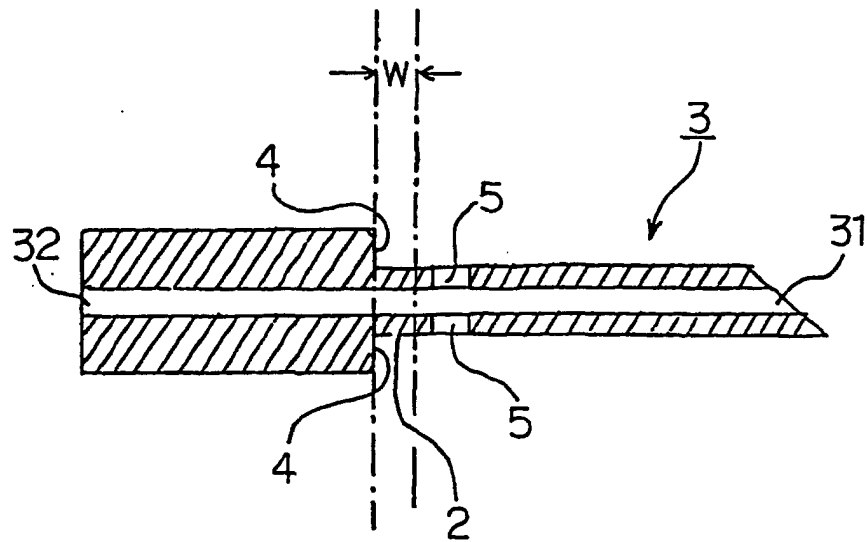


Fig. 7

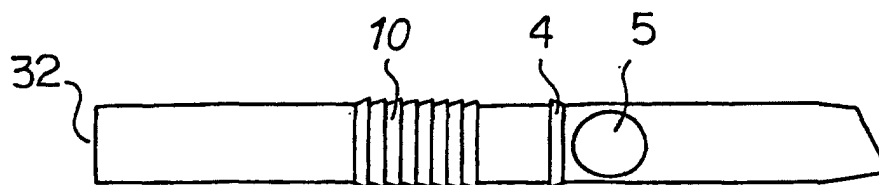


Fig. 2

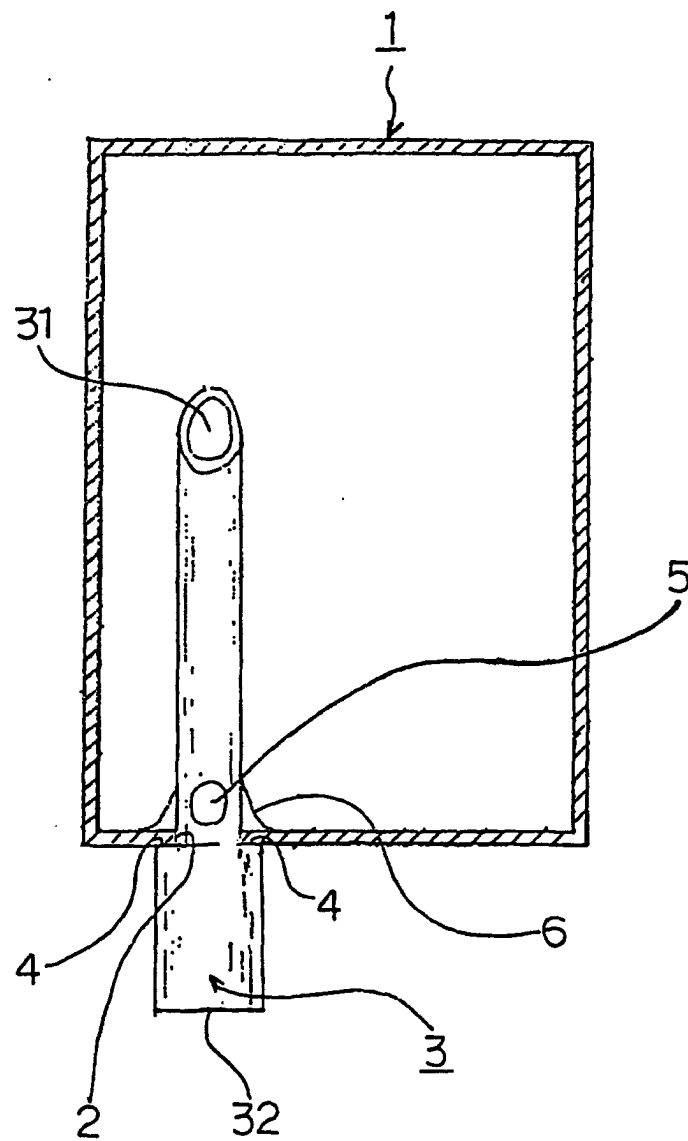


Fig. 3(a)

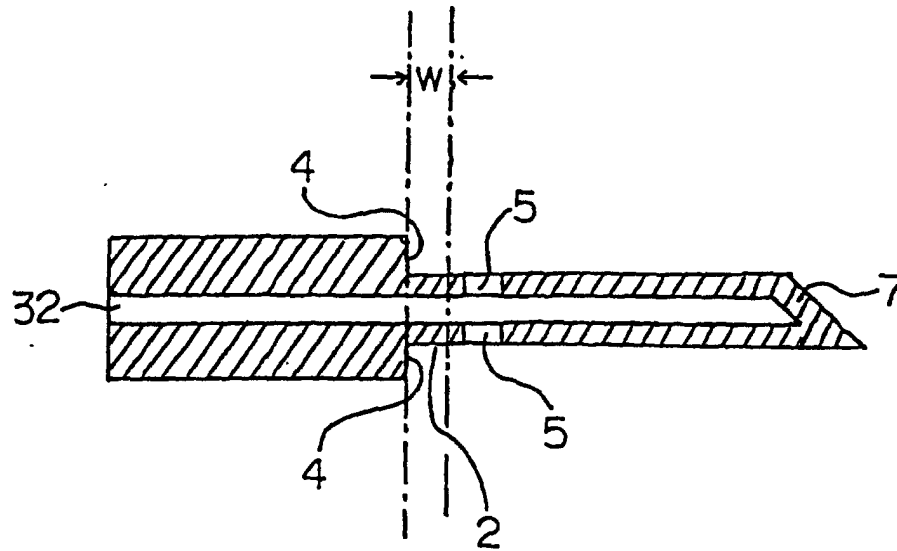


Fig. 3(b)

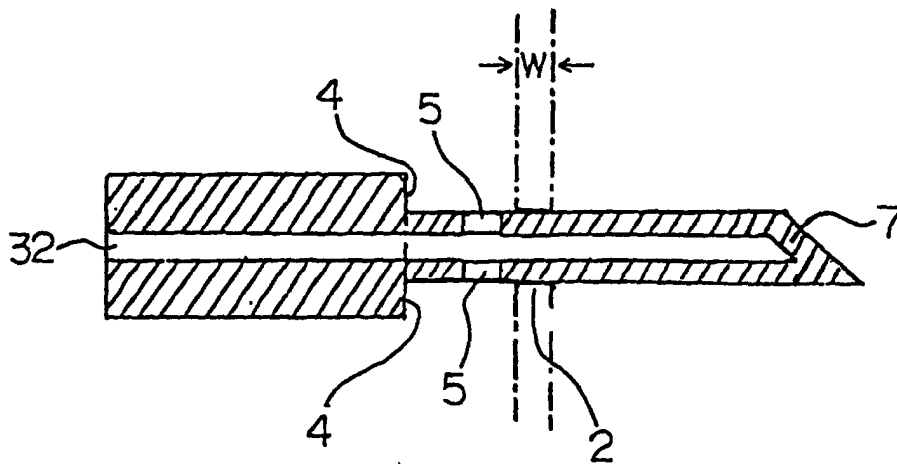


Fig.4(a)

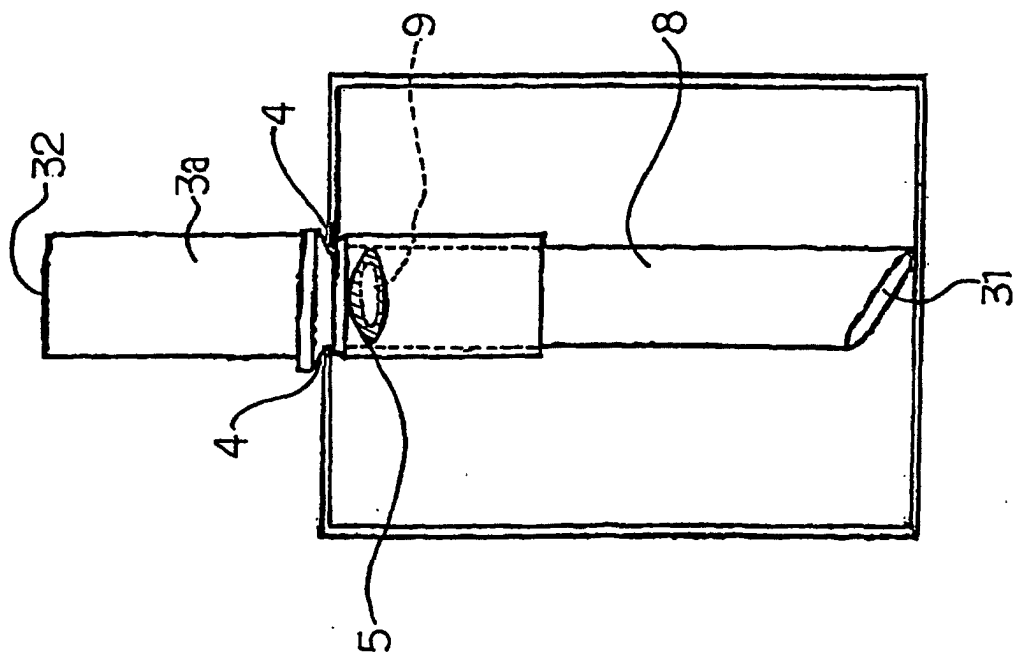


Fig.4(b)

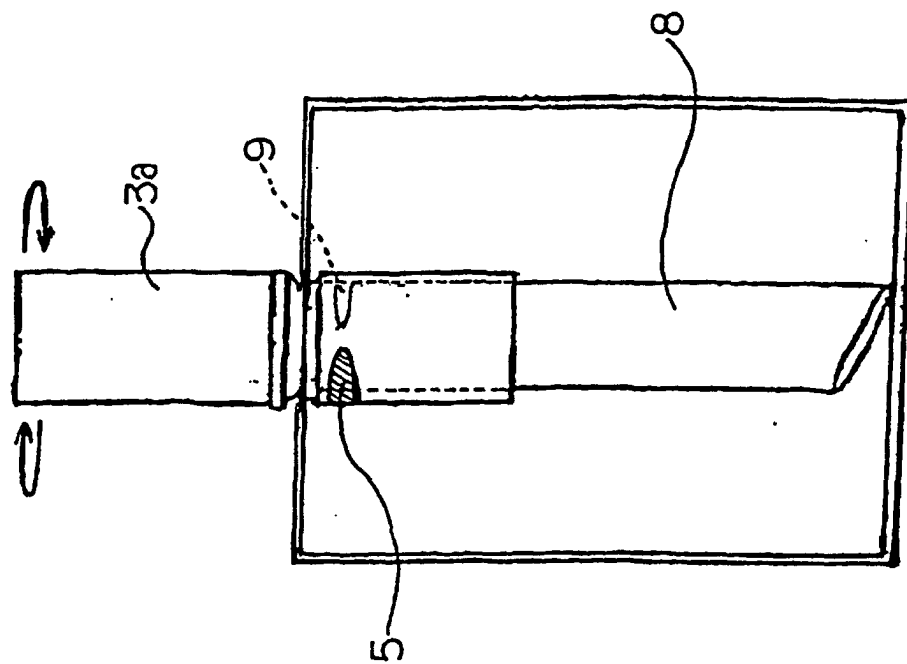


Fig.5(b)

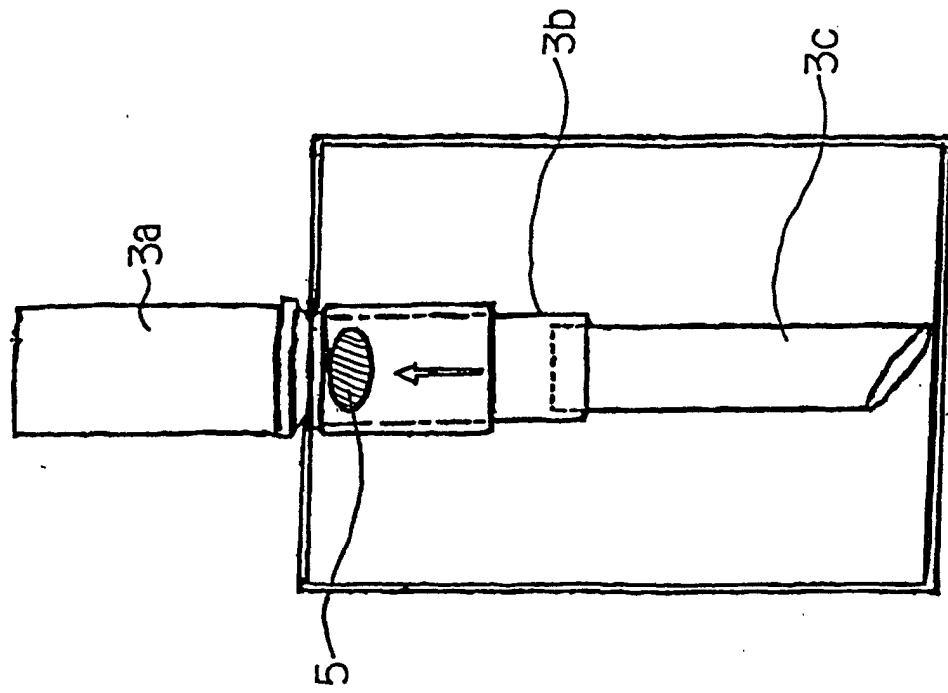
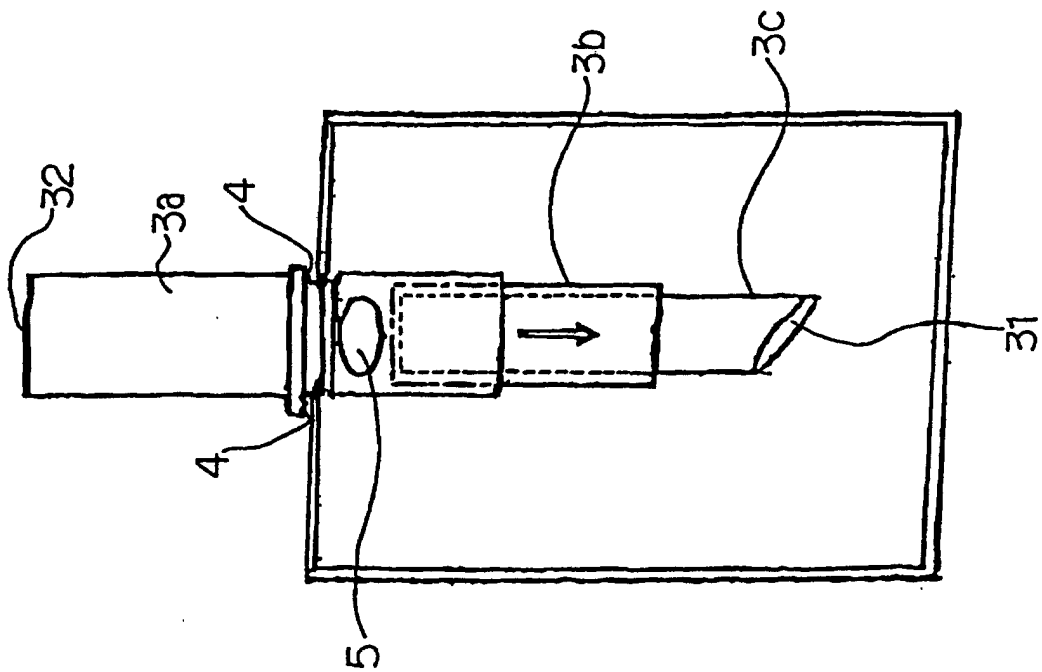


Fig.5(a)



Insert Direction
→

Fig.6(a)

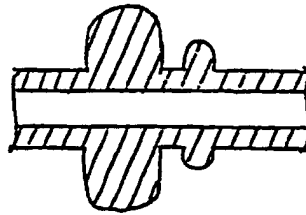


Fig.6(b)

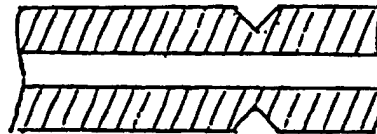


Fig.6(c)

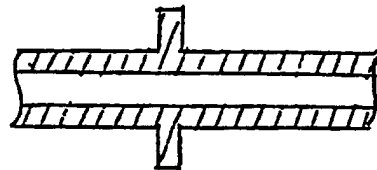


Fig.6(d)

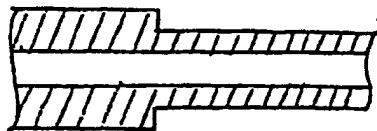
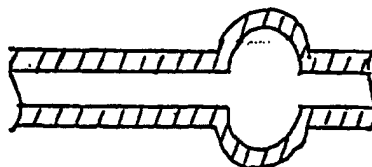


Fig.6(e)



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP02/01488

A. CLASSIFICATION OF SUBJECT MATTER

Int.Cl⁷ B65D83/00, B65D77/28

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)

Int.Cl⁷ B65D85/57, B65D77/28

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Jitsuyo Shinan Koho	1926-1996	Toroku Jitsuyo Shinan Koho	1994-2002
Kokai Jitsuyo Shinan Koho	1971-2002	Jitsuyo Shinan Toroku Koho	1996-2002

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	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 20926/1982 (Laid-open No. 121898/1983) (Yumi ITO); 25 May, 1973 (25.05.73), Full text; Figs. 1 to 3 (Family: none)	1, 3, 6, 7
Y	JP 55-84229 U (Kabushiki Kaisha Hokushin Denki Seisakusho), 10 June, 1980 (10.06.80), Claims; Figs. 1, 2 (Family: none)	1, 3, 6, 7
A	JP 7-289408 A (Toyo Kyappu Seizo Kabushiki Kaisha), 07 November, 1995 (07.11.95), Par. Nos. [0017] to [0028]; Figs. 1 to 8 (Family: none)	2, 4, 5, 8-10

☐ Further documents are listed in the continuation of Box C.☐ See patent family annex.

* Special categories of cited documents:	"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
"A" document defining the general state of the art which is not considered to be of particular relevance	"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
"E" earlier document but published on or after the international filing date	"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
"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)	"&" document member of the same patent family
"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	

Date of the actual completion of the international search
15 May, 2002 (15.05.02)Date of mailing of the international search report
28 May, 2002 (28.05.02)Name and mailing address of the ISA/
Japanese Patent Office

Authorized officer

Facsimile No.

Telephone No.

Form PCT/ISA/210 (second sheet) (July 1998)