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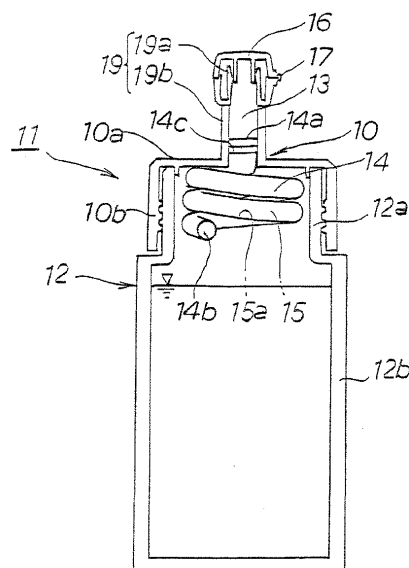
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(54) **CAP FOR SQUEEZE CONTAINER**

(57) In a cap (10) for a squeeze container to discharge content liquid from a top discharge opening (13) with squeeze deformation of a barrel section (12b) of a container body (12) to be used as being attached to a mouth neck section (12a) of the container body (12) made of plastic as being squeeze-deformable, at least a part of a liquid flow path from the mouth neck section (12a) of the container body (12) to the discharge opening (13) is formed as a helical flow path (15). The helical flow path (15) includes a bottom face section (15a) which is formed to have declination toward the barrel section (12b) of the container body (12) in an erected state of the squeeze container (11). The helical flow path (15) is formed by a helical tube (14) which is arranged inside the cap (10) for a squeeze container, for example.

Fig. 1



Description

Technical Field

[0001] The present invention relates to a cap for a squeeze container, and in particular, relates to a cap for a squeeze container to be used as being attached to a mouth neck section of a plastic-made container body which is squeeze-deformable.

Background Art

[0002] A squeeze container discharges a specific amount of content liquid from a discharge opening toward a discharge position owing to deformation of a container body by being squeezed (i.e., compressed) as a barrel section of the container body being held with a hand. In many cases, the squeeze container is used as having a cap with the discharge opening attached to the mouth neck section of the squeeze-deformable plastic-made container body in a detachably attachable manner so that content liquid can be supplemented or replaced. With such a squeeze container, content liquid is discharged by a specific amount by squeezing the container body in a state that the discharge opening is directed to a discharge position as tilting or inverting the held squeeze container after an outer cover which covers the discharge opening is removed, for example.

[0003] Further, with the squeeze container, when the squeezed state is released, liquid is sucked with a so-called back suction effect generating negative pressure at the inside of the container body of which deformation is to be cancelled. Accordingly, content liquid around the discharge opening can be drawn back to the inside of the container body.

[0004] Meanwhile, when the squeeze container is tilted or inverted with holding of the barrel section of the container body, there may be a case that leaking and dripping of content liquid occurs from the discharge opening owing to internal pressure of the container body and self-weight of the content liquid. Since such unexpected leaking and dripping of content liquid cause external soiling of the squeeze container, hand soiling in usage and the like, technologies to prevent the above have been developed variously (see Patent Literature 1, Patent Literature 2 and Patent Literature 3, for example).

[0005]

Patent Literature 1: Japanese Registered Utility Model 2600057

Patent Literature 2: Japanese Patent Laid-Open 2006-219181

Patent Literature 3: Japanese Patent Laid-Open 2003-226377

Summary of Invention

[0006] According to Patent Literature 1, liquid leaked

before squeezing is prevented from being stuck to the vicinity of a container body by arranging a side wall at a cap to which a discharge opening is formed at the center of a top face section as being obliquely extended toward the center side from a peripheral section of the top face section. However, since liquid is leaked over wide range of the top face section at the inside of the peripheral section, liquid stopping is worsened owing to insufficient liquid sucking with back suction. Meanwhile, according to Patent Literature 2, content liquid is not discharged unless a container body is squeezed so that occurrence of unnecessary liquid dripping can be effectively avoided by arranging liquid inflow opening at the vicinity of the discharge opening as bending a dip tube which is communicated with the discharge opening of a cap to be a U-shape. However, the U-shaped bent tube structure causes inconvenience for handling at the time of attaching and detaching of the cap. In addition, when squeezing is performed in a state that content liquid remains at the inside of the dip tube, there may be a case that liquid is splashed peripherally owing to air mixing. Meanwhile, according to Patent Literature 3, occurrence of liquid dripping is avoided as returning liquid which remains in a trap room by fixedly arranging a closed-end cylindrical trap room at a lower side of a discharge opening section and forming communication holes at a periphery wall section and a bottom section of the closed-end cylindrical body. However, since liquid cannot be discharged until liquid is accumulated to a certain level in the trap room, there may be a problem such that a discharge amount is lessened or cannot be adjusted especially at the first time. Accordingly, discharge amount stabilization, liquid dripping prevention and preferable liquid stopping are not sufficiently satisfied even in any of the above cases. Therefore, further technology development to prevent such problems has been desired.

[0007] The present invention relates to a cap for a squeeze container with which leaking and dripping of container liquid before squeezing can be effectively prevented, favorable liquid stopping with back suction can be obtained, a compact shape for easy handling during attaching and detaching of the cap can be obtained, and air mixing with content liquid can be effectively prevented as well.

[0008] The present invention provides a cap for a squeeze container to discharge content liquid from a top discharge opening with squeeze deformation of a barrel section of a container body to be used as being attached to a mouth neck section of the container body made of plastic as being squeeze-deformable.

Further, the present invention provides a cap for a squeeze container having a helical flow path at least as a part of a liquid flow path from the mouth neck section of the container body to the discharge opening.

Brief Description of Drawings

[0009]

FIG. 1 is a sectional view of a squeeze container to which a cap for a squeeze container according to the first embodiment preferable for the present invention is attached.

FIGS. 2(a) and 2(b) are a perspective view and a side view of a helical tube to form a helical flow path which structures the cap for a squeeze container according to the first embodiment preferable for the present invention.

FIG. 3 is a sectional view of a cap for a squeeze container according to the second embodiment preferable for the present invention.

FIG. 4 is a sectioned perspective view of the cap for a squeeze container according to the second embodiment preferable for the present invention.

FIG. 5 is a side view of a helical blade to form a helical flow path which structures the cap for a squeeze container according to the second embodiment preferable for the present invention.

Description of Embodiments

[0010] In the following, the present invention will be described with reference to the drawings based on preferable embodiments. FIG. 1 illustrates a squeeze container 11 to which a cap 10 for a squeeze container according to the first embodiment preferable for the present invention is attached. As illustrated in FIG. 1, the cap 10 for a squeeze container is used as being attached to a mouth neck section 12a of a plastic-made container body 12 which is squeeze-deformable. The cap 10 for a squeeze container has a discharge opening 13 as being opened at the top end and a specific amount of content liquid can be discharged by feeding the content liquid to the discharge opening 13 of the cap 10 for a squeeze container from a barrel section 12b via the mouth neck section 12a with deformation of the container body 12 as squeezing (i.e., compressing) the barrel section 12b of the container body 12 after the discharge opening 13 is directed to a discharge position while a user tilts or inverts the squeeze container 11 as grasping the barrel section 12b of the container body 12. Further, the cap 10 for a squeeze container has a function enabling to prevent leaking and dripping of content liquid from the discharge opening 13 owing to internal pressure of the container body 12 and self-weight of the content liquid after the discharge opening of the squeeze container 11 is directed to a discharge position until the barrel section 12b of the container body 12 is squeezed.

[0011] That is, the cap 10 for a squeeze container according to the first embodiment is a cap to discharge content liquid from the top discharge opening 13 with squeeze deformation (i.e., compression deformation) of the barrel section 12b of the container body 12 to be used as being attached to the mouth neck section 12a of the plastic-made container body 12 which is deformable when being squeezed. In the cap for a squeeze container, at least a part of a liquid flow path from the mouth neck

section 12a of the container body 12 to the discharge opening 13 is formed as a helical flow path 15.

[0012] Further, in the first embodiment, the helical flow path 15 is arranged so that a bottom face section 15a thereof is formed to have declination toward the barrel section 12b of the container body 12 in an erected state of the squeeze container 11. Here, the declination includes a state that the bottom face section 15a of the helical flow path 15 is formed as being declined as a whole even a horizontal part exists at a midway thereof.

[0013] Further, in the first embodiment, the helical flow path 15 is formed by a helical tube 14 which is arranged inside the cap 10 for a squeeze container while the upper end of the helical tube 14 is communicated with the discharge opening 13 via an upper end opening 14a, and the lower end of the helical tube 14 is placed at the inside of the mouth neck section 12a of the container body 12 via a lower end opening 14b.

[0014] In the first embodiment, the container body 12 being a bottle-shaped plastic container having squeeze-deformable flexibility includes the barrel section 12b in which content liquid is accommodated and the mouth neck section 12a of which upper end is formed as an opened face and which is formed as being protruded upward from the upper end of the barrel section 12b, as illustrated in FIG. 1. The cap 10 for a squeeze container is attached to the mouth neck section 12a with any of a variety of known screwing means and fitting means in a detachably attachable manner. Further, the container body 12 can be easily formed with blow molding, for example, by utilizing a variety of known synthetic resin.

[0015] Here, the content liquid capable of being accommodated in the container body 12 includes liquid composition to be used as being measured, such as clothing liquid detergent, fabric softener, bleach and liquid bath agent. Further, it is also possible to be used for liquid food such as food oil and seasoning.

[0016] The cap 10 for a squeeze cap being a plastic-made molded piece, for example, includes a circular top face section 10a and a peripheral wall section 10b having an annular skirt shape integrally extended downward from a peripheral part of the top face section 10a. The top face section 10a is provided with a nozzle section 19 as being protruded upward from a center part thereof. The nozzle section 19 includes a cylindrical intermediate section 19b formed as rising from the top face section 10a and a nozzle body 19a fixed to a top end part of the cylindrical intermediate section 19b. The discharge opening 13 is formed as vertically penetrating through the cylindrical intermediate section 19b and the nozzle body 19a of the nozzle section 19. Further, at the nozzle section 19, a cover body 16 capable of opening and closing the top end opening of the nozzle body 19a is swingably joined to the nozzle body 19a via a hinge section 17. Accordingly, the discharge opening 13 is hermetically closed at the time of storage of the squeeze container 11.

[0017] Further, an internal thread is formed, for example, at the inner face of an approximate half part of the

annular-shirt-shaped peripheral wall section 10b. The cap 10 is attached to the mouth neck section 12a in a detachably attachable manner by fastening the internal thread to an external thread which is formed at an outer peripheral face of the mouth neck section 12a of the container body 12, for example.

[0018] In the first embodiment, the helical tube 14 which forms the helical flow path 15 as being arranged inside the cap 10 for a squeeze container is a plastic-made molded piece. As illustrated in FIGS. 2(a) and 2 (b), a cylindrical tube having a hollow circular cross-section is extended as being wound to be a coil-spring-like helical shape and an upper end attaching section 14c with two undercut lines for engagement is vertically formed as bending the upper end part radially-inward and further bending upward along a center axis part of the helical shape. In this manner, the helical tube 14 is formed in a state that the upper end opening 14a is upwardly opened. In addition, the helical tube 14 is formed in a state that the lower end opening 14b is opened obliquely downward along a tangential direction of the helical shape.

[0019] Further, in the first embodiment, the upper end attaching section 14a of the helical tube 14 is attached as being shoehorned into a lower end part of the cylindrical intermediate section 19b of the nozzle section 19 from the lower side, so that the helical tube 14 is arranged inside the peripheral wall section 10b of the cap 10 in a state of being hanged from the lower end part of the cylindrical intermediate section 19b. Further, with the above structure, the upper end of the helical tube 14 is communicated with the discharge opening 13 via the upper end opening 14a and the lower end opening 14b at the lower end of the helical tube 14 is opened inside the mouth neck section 12c of the container body 12. In addition, the bottom face section 15a of the helical flow path 15 being bent and extended helically with the helical tube 14 forms declination continuously tilted toward the barrel section 12b of the container body 12 from the upper end of the helical tube 14 in an erected state of the squeeze container 11.

[0020] According to the cap 10 for a squeeze container of the first embodiment having the above structure, leaking and dripping of content liquid before squeezing the squeeze container 11 can be effectively prevented and favorable liquid stopping can be obtained with back suction. In addition, air mixing with content liquid can be effectively prevented as well while having a compact shape which can be easily handled at the time of attaching and detaching of the cap 10.

[0021] That is, according to the cap 10 for a squeeze container of the first embodiment, the helical flow path 15 bending and extending at least a part of the liquid flow path from the mouth neck section 12a of the container body 12 to the discharge opening 13 is formed by the helical tube 14. When the squeeze container 11 is tilted or inverted, content liquid is discharged from the discharge opening 13 after passing through the liquid flow

path bended and extended with the helical flow path 15. Accordingly, a certain amount of time is required for content liquid to pass through the bent and extended helical flow path 15 as well as smoothly discharging content liquid from the discharge opening 13 after passing through the liquid flow path. Further, the entire wall face of the helical flow path 15 is contacted with content liquid while the content liquid is discharged, that is, while the content liquid passes through the liquid flow path. Therefore, the content liquid can be held for a long time as being less likely to be replaced by air from the discharge opening 13 into the flow path. Accordingly, it is possible to effectively prevent leaking and dripping of content liquid from the discharge opening 13 owing to internal pressure of the container body 12 and self-weight of the content liquid after the discharge opening 13 is directed to a discharge position as tilting or inverting the squeeze container 11 until the barrel section 12b of the container body 12 is squeezed.

[0022] Further, in the first embodiment, since leaking and dripping of content liquid before squeezing the barrel section can be effectively prevented as described above, favorable liquid stopping of content liquid with back suction can be obtained when the squeezed state is released. Here, when volume of the part of the liquid flow path (i.e., the helical flow path 15) bent and extended with the helical tube 14 is set to be smaller than a decreased amount of volume of the barrel section 12b due to deformation of the container body 12 at the time of squeezing of the squeeze container 11, the liquid stopping with back suction can provide a more favorable liquid stopping effect.

[0023] Further, since the cap 10 for a squeeze container of the first embodiment has a compact shape as the helical tube 14 forming the helical flow path 15 is stored inside the peripheral wall section 10b, it is possible to be attached to and detached from the mouth neck section 12a of the container body 12 with the approximately same operation as a traditional cap.

[0024] Further, according to the cap 10 for a squeeze container of the first embodiment, the bottom face section 15a of the helical flow path 15 bent and extended with the helical tube 14 is formed to have declination toward the barrel section 12b of the container body 12 in an erected state of the squeeze container 11. Therefore, even when content liquid remains in the helical flow path 15, the remaining content liquid is smoothly recovered to the barrel section 12b of the container body 12 as falling owing to self-weight along the declination of the bottom face section 15a only by placing the squeeze container 11 in an erected state after usage, for example. Accordingly, since content liquid is not left in the bent and extended helical flow path 15 when the barrel section 12b is to be squeezed with holding of the container body 12 at the time of the next usage of the squeeze container 11, it is possible to effectively prevent content liquid from being splashed owing to air mixing with the content liquid.

[0025] Further, in the first embodiment, since cross-

section area of the discharge opening 13 and the liquid flow path are not required to be lessened, it is possible to effectively prevent squeeze pressure from being heightened at the time when the barrel section 12b of the container body 12 is squeezed.

[0026] FIGS. 3 and 4 illustrate a cap 20 for a squeeze container of the second embodiment preferable for the present invention. In the cap 20 for a squeeze container of the second embodiment, the helical flow path 15 structuring as at least a part of the liquid flow path from the mouth neck section 12a of the container body 12 to a discharge opening 13' is formed by a helical blade 21 which is arranged at a cylindrical leading path 18 oriented toward the discharge opening 13' of the cap 20.

[0027] That is, as illustrated also in FIG. 5, the helical blade 21 is a plastic-made molded piece formed integrally with a center axis member 22. For example, a support rod 23 formed integrally with the center axis member 22 at the lower end thereof is joined to a peripheral part of a lower end opening of the cylindrical leading path 18, so that the helical blade 21 is arranged as being shoe-horned into an upper part of the cylindrical leading path 18, preferably in a state that a peripheral end face of the helical blade 21 is contacted to an inner face of the cylindrical leading path 18. The helical blade 21 placed in the cylindrical leading path 18 forms the bent and extended helical flow path 15 at the liquid flow path from the mouth neck section 12a of the container body 12 to the discharge opening 13' of the cap 25 via the cylindrical leading path 26. Further, the bottom face section 15a of the helical flow path 15 formed by the helical blade 21 forms declination continuously tilted toward the barrel section 12b of the container body 12 from the upper end of the helical blade 21 in an erected state of the squeeze container 11.

[0028] According to the cap 20 for a squeeze container of the second embodiment as well, the helical flow path 15 bent and extended with the helical blade 21 is formed at at least a part of the liquid flow path from the mouth neck section 12a of the container body 12 to the discharge opening 13' and the bottom face section 15a of the helical flow path 15 with the helical blade 21 is formed to have declination in an erected state of the squeeze container 11. Therefore, similar operational effects to the cap 10 for a squeeze container of the first embodiment can be obtained.

[0029] Here, not limited to the above embodiments, the present invention may be modified variously. For example, not limited to the helical tube and the helical blade which are described above, another member may be utilized variously as the member for forming a helical flow path to be arranged at least at a part of a liquid flow path from a mouth neck section of a container body to a discharge opening. For example, it is possible to utilize an attaching plate and the like having a helical groove on an upper face thereof capable of being fitted toward the inside of a top face section of a cap.

Industrial Applicability

[0030] According to the cap for a squeeze container of the present invention, leaking and dripping of content liquid before squeezing the squeeze container can be effectively prevented and favorable liquid stopping can be obtained with back suction. In addition, air mixing with content liquid can be effectively prevented as well while having a compact shape which can be easily handled at the time of attaching and detaching of the cap.

Claims

1. A cap for a squeeze container to discharge content liquid from a top discharge opening with squeeze deformation of a barrel section of a container body to be used as being attached to a mouth neck section of the container body made of plastic as being squeeze-deformable, wherein at least a part of a liquid flow path from the mouth neck section of the container body to the discharge opening is formed as a helical flow path.
2. The cap for a squeeze container according to claim 1, wherein the helical flow path includes a bottom face section which is formed to have declination toward the barrel section of the container body in an erected state of the squeeze container.
3. The cap for a squeeze container according to claim 1 or claim 2, wherein the helical flow path is formed by a helical tube which is arranged inside the cap while the upper end of the helical tube is communicated with the discharge opening and the lower end of the helical tube is placed at the inside of the mouth neck section of the container body.
4. The cap for a squeeze container according to claim 1 or claim 2, wherein the helical flow path is formed by a helical blade which is arranged at a cylindrical leading path oriented toward the discharge opening of the cap.

Fig. 1

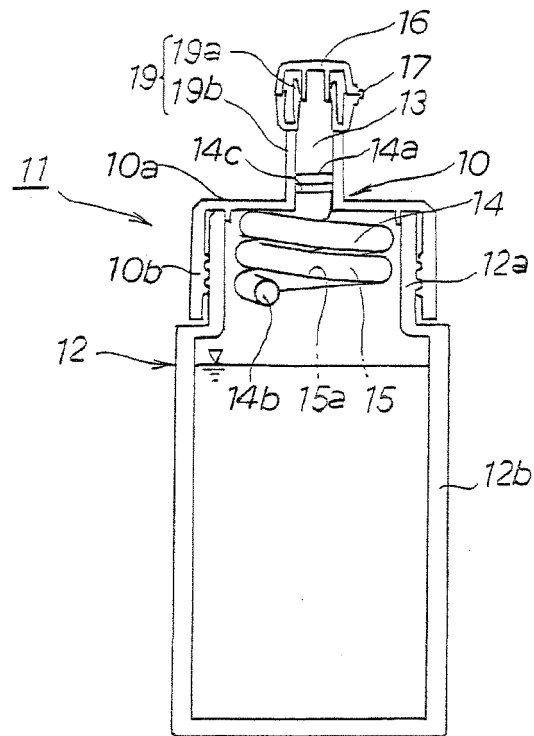


Fig. 2(a)

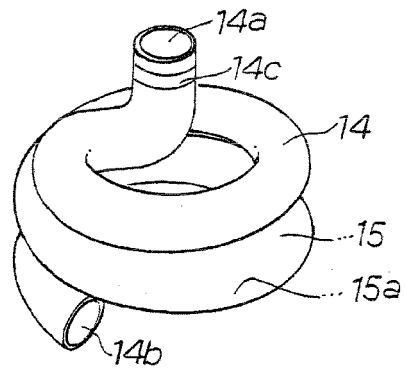


Fig. 2(b)

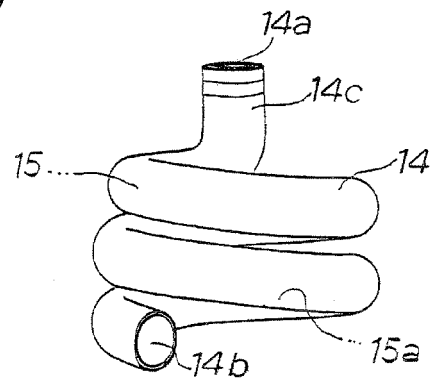


Fig. 3

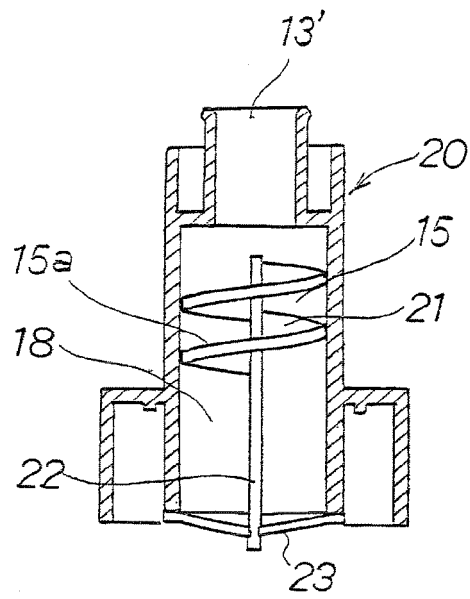


Fig. 4

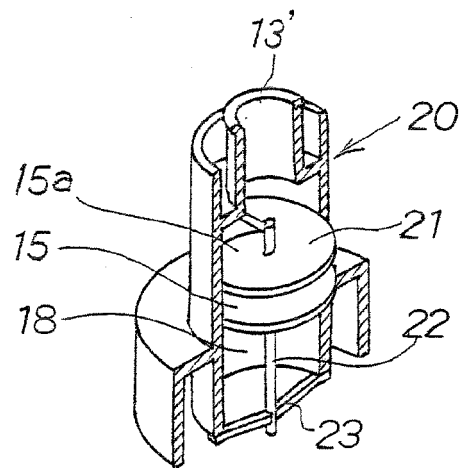
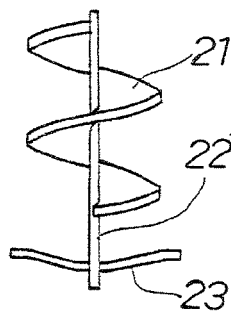


Fig. 5



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2010/067737

A. CLASSIFICATION OF SUBJECT MATTER <i>B65D47/40 (2006.01) i, B65D47/06 (2006.01) i, B65D83/00 (2006.01) i</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) <i>B65D47/40, B65D47/06, B65D83/00</i>														
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched <table border="0"> <tr> <td>Jitsuyo Shinan Koho</td> <td>1922-1996</td> <td>Jitsuyo Shinan Toroku Koho</td> <td>1996-2010</td> </tr> <tr> <td>Kokai Jitsuyo Shinan Koho</td> <td>1971-2010</td> <td>Toroku Jitsuyo Shinan Koho</td> <td>1994-2010</td> </tr> </table>			Jitsuyo Shinan Koho	1922-1996	Jitsuyo Shinan Toroku Koho	1996-2010	Kokai Jitsuyo Shinan Koho	1971-2010	Toroku Jitsuyo Shinan Koho	1994-2010				
Jitsuyo Shinan Koho	1922-1996	Jitsuyo Shinan Toroku Koho	1996-2010											
Kokai Jitsuyo Shinan Koho	1971-2010	Toroku Jitsuyo Shinan Koho	1994-2010											
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.												
X Y	JP 2003-221052 A (Daipura Kabushiki Kaisha), 05 August 2003 (05.08.2003), paragraphs [0005] to [0009]; fig. 1 (Family: none)	1-2, 4 3												
Y	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 100095/1980 (Laid-open No. 22377/1982) (Showa Sangyo Co., Ltd.), 05 February 1982 (05.02.1982), page 4, lines 5 to 9; fig. 2 (Family: none)	3												
☒ Further documents are listed in the continuation of Box C. ☐ See patent family annex.														
<table border="0"> <tr> <td>* Special categories of cited documents:</td> <td>"I" 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>"A" document defining the general state of the art which is not considered to be of particular relevance</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>"E" earlier application or patent but published on or after the international filing date</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>"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>"&" document member of the same patent family</td> </tr> <tr> <td>"O" document referring to an oral disclosure, use, exhibition or other means</td> <td></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>			* Special categories of cited documents:	"I" 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 application or patent 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	
* Special categories of cited documents:	"I" 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 application or patent 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 04 January, 2011 (04.01.11)		Date of mailing of the international search report 18 January, 2011 (18.01.11)												
Name and mailing address of the ISA/ Japanese Patent Office		Authorized officer												
Facsimile No.		Telephone No.												

Form PCT/ISA/210 (second sheet) (July 2009)

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2010/067737

C (Continuation). 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. 9257/1985 (Laid-open No. 125953/1986) (Hiroyuki OGASAWARA), 07 August 1986 (07.08.1986), page 7, lines 12 to 17; fig. 1 (Family: none)	3

Form PCT/ISA/210 (continuation of second sheet) (July 2009)

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2010/067737

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

Although the matter common to claims 1 - 4 is relevant to the matter specified in claim 1, the search revealed the afore-said matter is not novel, since said matter is disclosed in JP 2003-221052 A (Daipura Kabushiki Kaisha), 5 August 2003 (05.08.2003), paragraphs [0005] - [0009], fig. 1.
(continued to extra sheet)

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☒ As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☐ No protest accompanied the payment of additional search fees.

Form PCT/ISA/210 (continuation of first sheet (2)) (July 2009)

INTERNATIONAL SEARCH REPORT

International application No.

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Continuation of Box No.III of continuation of first sheet (2)

As a result, the above-said matter does not make a contribution over the prior art, and therefore, the common matter is not a special technical feature within the meaning of PCT Rule 13.2, second sentence.

Consequently, the above-said inventions have no technical relationship involving one or more of the same or corresponding special technical features, and therefore cannot be considered to be so linked as to form a single general inventive concept.

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP 2600057 B [0005]
- JP 2006219181 A [0005]
- JP 2003226377 A [0005]