

Water purifying cartridge for empty pet bottle

BACKGROUND OF THE INVENTION

FIELD OF THE INVENTION

The present invention relates to a water purifying cartridge for an empty pet bottle attached to inside of an empty pet bottle of a pet bottle container on sale, content of which has been consumed, putting tap water or the like to the inside of the pet bottle and enabling removal of bleaching powder, oxidation and reduction, ion exchange and the like of the tap water.

DESCRIPTION OF THE RELATED ART

Conventionally, as a cartridge of this kind, there has been proposed 'water storing type water purifier used by attaching to bottle container ' in Japanese Patent Laid-Open No.77026/1199.

Fig.6 is an outline view of mounting a water storing type water purifier used by attaching to a bottle container proposed in Japanese Patent-Laid Open No.77026/1999 and Fig.7 is a sectional view of a cap portion 102 of the water purifier.

In Fig.6 and Fig.7, numeral 101 designates a neck portion of the water purifier, numeral 102 designates the cap portion, numeral 103 designates a water inlet thereof, numeral 104 designates a connecting portion thereof, numeral 105 designates an adsorbing and filtering material portion, numeral 107 designates a cap of a bottle container, numeral 108 designates the bottle container, and numeral 109 designates a spout of the bottle container which is omitted in Fig.6. Further, numeral 102 designates the cap portion, a fitting portion of the cap portion 102 is formed with a thread portion 106 to which a fitting portion of the cap 107 of the bottle container 108 is pivotally attached, at an upper outer portion thereof, and at inside thereof, there is arranged a fitting portion screwed to fit to the bottle container spout 109 of the bottle container 108 via a spout seal 110 which is brought into close contact with the bottle container spout 109.

There poses the following problem in the water storing type water purifier used by attaching to the bottle container disclosed in Japanese Patent Laid-Open No.77026/1999, mentioned above. That is, there is

constructed a constitution in which a front end of the neck portion 101 of the water purifier is screwed to fit to the cap 107 inherently provided to the bottle container and a middle portion thereof is screwed to fit to the spout 109 of the bottle container and therefore, the constitution is weak in strength, further, there is formed a gap of a screw structure into which the spout 109 of the bottle container is inserted and there is a concern of attaching dirt to the portion and generating fur or mold to the dirt which is problematic in view of hygiene.

Further, the bottle container and the water purifier are constituted to fixedly attach to each other such that the water purifier is screwed to fit to the thread portion of the spout 109 of the container and therefore, there poses a problem that the structure becomes complicated, fabrication thereof is difficult and an increase in the cost is unavoidable. Further, according to the pet bottle 108 of recent times, in view of hygiene, or in view of a danger of mixing a dangerous matter, as shown by Fig.8, the cap 107 before unsealing is frequently formed integrally with a seat member 111 that is formed at a lower

portion of the screw structure of the spout 109. When the conventional water purifier of this kind is intended to be attached to the pet bottle of this type, the water purifier cannot be attached thereto unless the seat member 111 is cut by nipper, pinch, scissors or the like and there poses a problem that the water purifier cannot simply be attached to empty pet bottles which are generally on sale and distributed by a large number.

SUMMARY OF THE INVENTION

The present invention has been devised in order to resolve the above-described problem and according to a first aspect of the present invention, there is provided a water purifying cartridge for an empty pet bottle comprising a flange member having a diameter substantially the same as an outer shape of a spout of an empty bottle, and having a thickness portion screwed to fit, in water tight, to an inner portion of a screw cap when the screw cap inherently provided to the empty pet bottle is fitted to a thread portion of the empty pet bottle and a water charging and discharging mouth portion opened to a substantially central portion of the flange member, a

hollow neck portion inserted to inside of the spout of the pet bottle successive to the flange member and having projected portions in a shape of a cross or a shape of a line brought into close contact with an inner diameter of the spout by a predetermined length, a filter portion arranged right under the neck portion, an extractable and contractable adjusting portion filled with one or two kinds or more of water purifying agents successive to the filter portion, a cylindrical portion filled with one or two kinds or more of water purifying agents successive to the adjusting portion, and a water purifying portion which is filled with one or two kinds or more of water purifying agents and an outer periphery of which is provided with meshes or clearances for passing water therethrough.

The water purifying cartridge for the empty pet bottle may be attached thereto by providing a packing member which is fitted, in water tight, to an inner diameter portion of the spout of the empty pet bottle substantially in the same shape and an inner portion of which is fitted with a main body of the water purifying cartridge to the spout of the empty pet bottle.

The adjusting portion, the cylindrical portion and the water purifying portion may be respectively removable and the water purifying agents filled to inner portions thereof may be formed exchangeably.

A lower portion of the water purifying portion may be formed by a removable lid structure for exchanging the water purifying agents.

The adjusting portion filled with the water purifying agents, the cylindrical portion filled with the water

purifying agents and the water purifying portion an outer periphery of which is provided with the meshes or the clearances for passing water therethrough, may be constituted exchangeably in a state respectively filled with the water purifying agents.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a view showing an outline of a water purifying cartridge for an empty bottle according to a first embodiment in embodiments of the present invention related to a first through a fifth aspect of the application ;

FIG. 2 is a sectional view showing an outline constitution of a hollow neck portion having projected portions in a shape of a cross of the water purifying cartridge for an empty bottle according to the first embodiment;

FIG. 3 is an outline view showing materials of water purifying members and an example of arranging thereof in the water purifying cartridge for an empty pet bottle;

FIG. 4 is a view showing an example of an embodiment of the present invention using a packing member 20 of an

inserting and tight contacting type at a spout of a pet bottle ;

Fig.5 is an outline view of an outer shape of the packing member 20 ;

Fig.6 is an outline view of mounting Japanese Patent Laid-Open No.77026/1999 ' water storing type water purifier used by attaching to bottle container ' which has been proposed conventionally ;

Fig.7 is a sectional view of mounting Japanese Patent Laid-Open No.77026/1999 ' water storing type water purifier used by attaching to bottle container ' which has been proposed conventionally ; and

Fig.8 is a view showing that in a pet bottle having a seat member of a cap, the seat member needs to cut.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

A detailed explanation will be given of an embodiment of the present invention according to a first through a fifth aspect of the application in reference to the drawings.

Fig.1 is a view showing an outline of a water purifying cartridge for an empty pet bottle according to a

first embodiment in embodiments of the present invention related to the first through the fifth aspects of the application and showing an outline of a water purifying cartridge used for a large (2 liter or 1.5 liter) pet bottle on sale according to the cartridge of the first embodiment.

In the drawing, notation 1 designates a flange member having a diameter substantially equal to an outer shape of a spout of an empty pet bottle, and having a thickness portion which is screwed to fit, in water tight, to inside of a screw cap when the screw cap inherently provided to the empty bottle is fitted to a thread portion of the empty pet bottle, notation 2 designates a water charging and discharging mouth portion opened to a substantially central portion of the flange member, notation 3 designates projected portions in a shape of a cross or a line inserted into a spout of the empty pet bottle successive to the flange member, which are brought into close contact with an inner diameter of the spout by a predetermined length, notation 4 designates a hollow neck portion having the projected portions, notation 5

designates a filter portion arranged right under the neck portion, notation 6 designates a cylindrical portion filled with one or two kinds or more of water purifying agents, notation 7 designates a water purifying portion filled with one or two kinds or more of water purifying agents and having meshes or clearance for passing water therethrough at an outer periphery thereof, and notation 8 designates an extractable and contractable adjusting portion filled with one or two kinds or more of water purifying agents successive to the filter portion.

The flange member 1 formed in an outer size of the spout of the bottle, is provided with a thickness portion screwed to fit, in water tight, to inside of the cap when the screw cap inherently provided to the empty pet bottle is fitted to the thread portion of the pet bottle. Specifically, the flange member 1 is provided with the thickness portion of about 1 through 2mm. Further, according to a spout of a pet bottle of 1.5 liter, for example, a spout of a pet bottle on sale from Japan Coca Cola Co., Ltd., an outer shape thereof is 24mm, an inner diameter thereof is 22mm, a thickness thereof is 1mm and a

depth thereof is 22mm. According to a spout of a pet bottle of a 2 liter type, for example, a spout of a pet bottle on sale from Asahi Drinks Co., Ltd., an outer shape thereof is 24mm, an inner diameter thereof is 22mm, a thickness thereof is 2mm and a depth thereof is 19mm. Therefore, the outer diameter of the flange member may be the outer shape of 24mm and a size and a thickness thereof may not be so strict dimensions even when there is more or less error so far as the cap is fitted to the flange member and water-tightness thereof is ensured.

Further, there is arranged a packing member a portion of which is inserted into the spout of the empty pet bottle and which is formed in water tight, between the flange member 1 and the spout of the empty pet bottle and the packing member is formed to prevent water leakage from a clearance between the flange member 1 and the spout of the pet bottle.

Further, as shown by Fig.2, at a substantially central portion of the flange member, there is formed a water charging and discharging mouth portion for injecting tap water or the like into the pet bottle and discharging

the water in drinking thereof. Further, successive to the flange member, there is provided the hollow neck portion having the projected portions in a shape of a cross or a shape of a line which is inserted into the spout of the empty pet bottle and is brought into close contact with the inner diameter of the spout by a predetermined length.

Fig.2 is a view showing an outline constitution of the hollow neck portion having the projected portions in the shape of the cross.

That is, as shown by Fig.2, in the case of the water purifying cartridge for the empty pet bottle according to the embodiment, there is formed an outer peripheral flow path for supporting the cartridge in the pet bottle between a spout of the cartridge and a spout 11 of the empty pet bottle by the projected portions 10 and facilitating flow of tap water or the like coming in and going out to and from the pet bottle by a clearance formed at the surrounding. By partitioning the flow path in this way, for example, in flowing in water, when water is flowed in from the center, air is discharged from an outer side thereof, further, in taking out water from the bottle,

water is discharged from the outer peripheral flow path, air is flowed in from an upper opposed side thereof and accordingly, water is flowed in and flowed out smoothly.

Further, the cartridge is provided with the filter portion arranged right under the neck portion for preventing foreign matter, impurity or the like from mixing to inside thereof.

Further, one or two kinds or more of water purifier agents are filled to each of the adjusting portion, the cylindrical portion and the water purifying portion successive to the filter portion. Further, the cylindrical portion 6 and the water purifying portion 7 and the adjusting portion 8 are respectively removable. Therefore, one or two kinds or more of water purifying agents filled therewith are also exchangeable. Thereby, only the water purifying agents can be exchanged, it is not necessary to buy members constituting the cylindrical portion 6 and the water purifying portion 7 and the adjusting portion 8 and therefore, the water purifying agents can be exchanged in accordance with contamination thereof.

Further, since there is constructed a constitution

having a number of removable portions, a cleanable range is widened and fur or dirt is prevented from adhering, which is effective in view of hygiene. Further, also in view of waste treatment problem which is regarded as problematic at present, the constitution effectively amounts to a reduction in incombustible waste. Next, an explanation will be given of materials of the water purifying agents of the cartridge and arrangement thereof.

Fig.3 is an outline view showing materials of water purifying agents of a water purifying cartridge for an empty pet bottle. In the drawing, numeral 30 designates a member the same as that explained as the flange member 1, which is constituted such that a diameter thereof is substantially the same as the outer shape of the spout of the empty pet bottle, further, there is formed a thickness portion by which even when the screw cap inherently provided to the empty pet bottle is fitted to the thread portion of the empty pet bottle, the flange member is inclusively screwed to fit thereto in water tight. Further, numeral 31 designates a member the same as that explained as the filter portion 5 which is arranged right

under the neck portion 4. Numeral 32 designates the dechlorinating ceramic balls, numeral 33 designates a filter portion for dividing the dechlorinating ceramic balls and the kaiseki 34 arranged therebelow, below which there are successively arranged iouseki 35, antibacterial activated carbon 36 and biological mineral ceramics 37.

The dechlorinating ceramic ball 32 is provided with a biscuit structure for removing instantaneously bleaching powder smell (free chlorine smell) by utilizing chemical reaction. When compared with activated carbon generally and frequently utilized as a dechlorinating agent of this kind, activated carbon removes the bleaching powder smell by utilizing adsorption reaction and accordingly, a long period of time is required in removing thereof, in contrast thereto, in the case of the dechlorinating ceramics ball 32, a short period of time is required therefor and a small area is required therefor in comparison with activated carbon requiring a wide adhering area.

Further, kaiseki 34 is a general mineral stone eluted from the Paleozoic layer, further, iouseki 35 is famous as a medical stone and the two stones elute

minerals, are porous and provided with strong adsorption force and ion exchange function and provided with an effect of removing bleaching powder smell, adsorbing and removing poisonous organic compounds and, at a same time, carrying out ion exchange in an alkaline direction with respect to pH of water. That is, minerals are added further to mineral portions of tap water and activated water good for human body can be finished.

Therefore, here, there are carried out removing poisonous organic compounds or metal ions, achieving antibacterial power and strong reduction power, deodorant action, adding alkaline degree of pH by ion exchange and adding minerals by elution. Further, the antibacterial activated carbon 36 is porous, provided with a wide surface area of 1000 meter square per gram and there is carried out highly functional impurity removal utilizing the wide area. Further, there also is provided an effect of reducing bleaching powder smell or mold smell as less as possible and adsorbing and removing environmental hormone (bisphenol A, nonylphenol) currently posing a problem.

Further, the biological mineral ceramics 37 is

blent with biological mineral components extracted from 50 kinds or more of wild grass, sea weed, leaves of trees and so on and by only touching water thereby, the water is denatured to water having high oxidation and reduction power provided with life energy and resonant wave of wild plants and generally, the water is referred to as biologically balanced water.

Further, by constructing such an arrangement constitution, water inputted and flowed from above is subjected to a first stage of impurity removal at the filter portion 31, successively, water which has passed through the filter portion 31 is removed of bleaching powder smell by the dechlorinating ceramic ball 32 and subjected to a second stage of impurity removal by the filter portion 33 arranged therebelow. Further, water brought to the lower portion is added with minerals by the kaiseki 34 and the iouseki 35, successively, subjected to propagation restraint of various bacteria and deodorization in passing through the antibacterial activated carbon 36 and finally added with biological mererals by the biological mineral ceramic 37.

The arrangement is pointed out simply as an example, even when the alignment differs, there is not caused a difference in operation and effect of the present invention and the invention is not limited to the arrangement. Further, the various kinds of water purifying agents are not limited to the materials but even different substances can pertinently be selected and used so far as the substances are provided with water purifying operation.

Further, when the water purifying cartridge according to the embodiment is utilized for an empty pet bottle of a small bottle type, the constitution is similar to the water purifying cartridge according to the first embodiment in that by utilizing the screw cap inherently provided to the empty pet bottle, the cartridge is fitted to a thread portion of the empty pet bottle and is screwed to fit, in water tight, to inside of the cap and accordingly, the basic constitution substantially remains unchanged from that shown in the above-described first embodiment.

However, the empty pet bottle of the small bottle type differs from the pet bottle of a large bottle type in

a diameter and a thickness of the flange and a size of the projected portion and therefore, it is necessary to correspond to the diameter and the thickness of the flange and size of the projected portion. Further, in comparison with the water purifying cartridge according to the first embodiment, a length of a total thereof must be short.

According to a spout of a pet bottle of 500 milliliter of a small bottle type, for example, a spout of a pet bottle of 500 milliliter distributed from Otsuka Seiyaku Co., Ltd., the outer shape is 24mm, the inner diameter is 20mm, the thickness is 2mm and the depth is 23mm.

Other than thereof, according to a spout of a pet bottle of 500 milliliter distributed from Suntory Co., Ltd., the outer shape is 24mm, the inner diameter is 20mm, the thickness is 2mm and the depth is 22mm. Further, according to a spout of a pet bottle of 500 milliliter distributed from Kirin Beverage Co., Ltd., the outer shape is 24mm, the inner diameter is 22mm, the thickness is 1mm and the depth is 22mm and accordingly, the outer diameter of the flange member must correspond to the outer shape of 24mm, further, the thickness of the flange member 1 may be a thickness

ensuring water-tightness at a depth of a spout cap of the pet bottle, specifically, 1 through 2mm and the size and thickness may not be so strict dimensions even when there is more or less error, so far as the cap is fitted and the water-tightness is ensured.

Further, a total length of the water purifying cartridge of this type is formed to be short in comparison with the vertical length of the water purifying cartridge for a pet bottle of the large bottle type according to the first embodiment, mentioned above, in correspondence with the total length of the pet bottle of the small bottle type.

Further, although an explanation has been given of forming the cartridge in which the diameter and thickness of the flange and the size of the projected portion or the total length are adapted to those of the small bottle type for being used for the small bottle type, as mentioned above, the cartridge of the small bottle type is provided with the basic constitution the same as that in the first embodiment and therefore, basically, there is used the water purifying cartridge according to the first embodiment

and only different members, for example, the flange member 1 and the hollow neck portion 4 and the projected portions 3 may be exchanged by members adapted to the dimensions of the pet bottle type for small bottle and a length of the adjusting portion 8 may be adjusted to correspond to the small bottle use. The adjusting portion 8 is provided with the function extractable and contractable with regard to the vertical direction of the empty pet bottle and accordingly, when used in the empty pet bottle of the small bottle type, the vertical length is contracted to be short.

Further, although the water purifying cartridge according to the first or the second embodiment, is constituted by the flange member 1, the water charging and discharging mouth portion 2, the hollow neck portion 4 and so on, as shown by Fig.5, there may be provided a packing member 20 in order to promote close contact between the spout of the empty pet bottle and the water purifying cartridge according to the embodiment. Fig.4 is a view showing an embodiment of the present invention using the packing member 20 of a type inserted and brought into close contact with a spout of a pet bottle and Fig.5 is a view

showing an outline of an outer shape of the packing member 20. In Fig.4 and Fig.5, notation 20 designates the packing member for bringing the spout of the pet bottle and the cartridge into close contact with each other, notation 21 designates an empty pet bottle container, notation 22 designates a main body of the water purifying cartridge, notations 23 and 24 designate portions of filling the water purifying agents and notation 25 designates a filter portion.

As shown by Fig.5, the packing member 20 is constituted by an outer shape having a flange member 11 capable of ensuring water-tightness and having a diameter of 1 and contained in the cap even when the cap (not illustrated) inherently provided to the empty pet bottle is mounted thereon and material thereof is constituted by a member which is provided with elasticity and deformable such as a silicone member or a rubber member. By constituting in this way, when inserted into the spout of the empty pet bottle, the packing member 20 is brought into close contact with the inner portion, is difficult to detach and firmly supports the water purifying cartridge

main body 22 at the inner portion. Therefore, although a height h thereof is not restricted, the packing member 20 is provided with a pertinent height length, further, projected to an inner side direction, is provided with an annular projection 27 projected in an inner side direction and fitted to inside of a clearance portion 26 provided at a predetermined neck position of the water purifying cartridge and firmly supports the water purifying cartridge 22.

Further, the packing member 20 is provided with the flange member 11 having the diameter of l covering the spout of the pet bottle and completely contained to the inner portion even when the cap is mounted, as described above, similar to the water purifying cartridge 22 according to the first embodiment.

Further, although according to the embodiment, there is constructed a constitution that a front end of the water purifying cartridge 22 does not reach the surface of the flange member 11 of the packing member 20, the front end may pertinently reach the surface. Further, although according to embodiment, the packing member 20 is

constituted by a silicone member or a rubber member, any material can be used so far as the packing member is brought into close contact with the inner diameter portion of the spout of the pet bottle according to the present invention when inserted thereinto.

That is, when the screw cap inherently provided to the empty pet bottle is fitted to the thread portion of the empty pet bottle, the screw cap is screwed to fit thereto by covering the flange member 1 and therefore, when the material of the packing member is a deformable member having elasticity such as a silicone member or a rubber member, any material can be used for the packing member so far as highly close adherence is made possible.

Further, the packing member is formed such that the diameter is substantially the same as the outer shape of the spout of the empty pet bottle and a water charging and discharging mouth portion thereof opened to a substantially central portion of the flange member is constituted similar to the case of the first embodiment.

Further, the water purifying portion 7 may be constructed by a constitution of a lid structure to be

capable of detaching to be able to exchange only the water purifying agents, at a bottle portion thereof. Thereby, only the water purifying agents can be exchanged.

Further, the cylindrical portion 6, the purifying portion 7 and the adjusting portion 8 may be constructed by constitutions respectively exchangeable in states filled with the water purifying agents. Thereby, only a member filled with a significantly consuming water purifying agent may be exchanged and even when a member is worn, all the members need not exchange.

Further, when there is constructed an integral constitution by the flange portion 1, the water charging and discharging mouth portion 2, the projected portions 3 and the neck portion 4, by using silicone members, it is not necessary to independently prepare the packing member made of silicone.

The respective aspects of the present invention are constructed by the above-described constitutions and therefore, the problem of the water storing type water purifier used by attaching to a bottle container and disclosed in Japanese Patent Laid-Open No.77026/1999, is

resolved as follows.

There is constituted the flange member the diameter of which is substantially the same as the outer shape of the spout of the empty pet bottle and which is provided with the thickness portion by which even when the screw cap inherently provided to the empty pet bottle is fitted to the thread portion of the empty pet bottle, the flange member is screwed to fit thereto, in water tight, including the flange member and therefore, when the flange member is screwed to fit to the cap inherently provided to the bottle container at the front end of the water purifier, there is not caused weakness in strength when the flange member is screwed to fit to the portion of the bottle container at the middle portion and the strength is high.

Further, by constituting the above-described structure, that is, there is not a structure portion matching with the screw structure of the empty pet bottle and accordingly, there are not caused the problem of adhering dirt at the portion by forming a clearance of the screw structure inserted with the spout of the bottle and a problem in view of hygiene in which fur or mold is

generated at the dirt and the structure is clean.

Further, there is constructed a simple structure in which in fixedly attaching the bottle container and the purifier, the purifier is inserted from the spout of the empty pet bottle, the flange portion is mounted to an upper portion of the spout of the empty pet bottle and the cap portion of the empty pet bottle is closed along with the flange member. As a result, there is not caused the problem of fabrication owing to the complicated structure in which the flange portion is also screwed to fit to the thread portion of the spout of the bottle and an increase in the cost thereby, mass production is possible as a result of the simple structure, further, fabrication at a low cost is made possible.

Further, owing to the above-described constitution, there can be dispensed with time and labor of using the seat member formed at the lower portion of the screw structure by cutting thereof laboriously, which is present in the cap before unsealing thereof of the pet bottle in recent times, the mounting time period is shortened and accordingly, there is achieved an effect of capable of

utilizing the invention simply even when a tool such as a pinch or nipper is not present at hand.

CLAIMS:

1. A water purifying cartridge for an empty PET bottle comprising:

a flange member having a diameter substantially the same as an outer shape of a spout of an empty bottle and having a thickness portion screwed to fit, in water tight, to an inner portion of a screw cap when the screw cap inherently provided to the empty PET bottle is fitted to a thread portion of the empty PET bottle;

a water charging and discharging mouth portion opened to a substantially central portion of the flange member;

a hollow neck portion inserted to inside of the spout of the PET bottle successive to the flange member and having projected portions in a shape of a cross or a shape of a line brought into close contact with an inner diameter of the spout by a predetermined length;

a filter portion arranged right under the neck portion;

an extractable and contractable adjusting portion filled with one or two kinds or more of water purifying agents successive to the filter portion;

a cylindrical portion filled with one or two kinds or more of water purifying agents successive to the adjusting portion; and

a water purifying portion which is filled with one or two kinds or more of water purifying agents and an outer periphery of which is provided with meshes or clearances for passing water therethrough.

2. The water purifying cartridge for an empty PET bottle according to Claim 1,

wherein the adjusting portion, the cylindrical portion and the water purifying portion are respectively removable and the water purifying agents filled to inner portions thereof are formed exchangeably.

3. The water purifying cartridge for an empty PET bottle according to Claim 1 or 2,

wherein a lower portion of the water purifying portion is formed by a removable lid structure for exchanging the water purifying agents.

4. The water purifying cartridge for an empty PET bottle according to Claim 1, 2 or 3,

wherein the adjusting portion filled with the water purifying agents, the cylindrical portion filled with the water purifying agents and the water purifying portion an outer periphery of which is provided with the meshes or clearances for passing water therethrough, are constituted exchangeably in a state respectively filled with the water purifying agents.

5. The water purifying cartridge for an empty PET bottle according to any one of the preceding claims,

wherein the water purifying cartridge for the empty PET bottle is attached thereto by providing a packing member which is fitted, in water tight, to an inner diameter portion of the spout of the empty PET bottle substantially in the same shape and an inner portion of which is fitted with a main body of the water purifying cartridge to the spout of the empty PET bottle.