

Reusable Water Bottle with Integrated Disposable Filter

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Abstract: A flexible water bottle is provided that includes an approach for filtering unfiltered water within the bottle, the system having a bottle cap, a nozzle formed in a first side of the bottle cap, a porous filter housing formed on a second side of the bottle cap, and a filter material located inside the porous filter housing, wherein the cap, nozzle and filter housing are formed as an integrated unit, which can be attached and removed from a water bottle as a unit. The system is preferably used with a disposable plastic water bottle. Water is filtered when pressure generated by squeezing the bottle forces from the bottle cavity through the filter along an axial flow path in design for the removal of a variety of biological, organic, or inorganic contaminants and filtered water comes out through a spout.

I. DESCRIPTION

A. Background of the Invention

1. Field of the Invention

The present invention relates generally to water bottles, and more particularly to a disposable plastic water bottle having an integrated disposable cap and water filter, where the water bottle can be re-filled and re-used.

2. Description of the Related Art

Bottled water is gaining ever increasing popularity worldwide. Many negative consequences of this increase in popularity, however, are developing in the form of waste of fossil fuels and massive use of non-biodegradable plastics which are responsible for unsustainable environmental damage.

In response to this issue, many reusable water bottles have been introduced and are being sold worldwide. The reusable water bottles, however, have several drawbacks. These including rapidly warming and stale water, health issues related to long term use of the same plastic bottle, plastic odor, inconvenience of having to constantly carry the bottle and filling it from questionable tap waters, hygiene issues such as bacterial collection in nozzle and bottle interior, and finally, known harmful and potentially deadly agents such as BPA Bisphenol (BPA) found in inner coating of bottles.

B. Summary of The Invention

The present invention is bottled water filtration system for use with a bottled water bottle. In one embodiment, the system includes a bottle cap, a nozzle formed in a first side of the bottle cap, a porous filter housing formed on a second side of the bottle cap, and a filter material located inside the porous filter housing, wherein the cap, nozzle and filter housing are formed as an integrated unit, which can be attached and removed from a water bottle as a unit. The system is preferably used with a disposable plastic bottled water bottle. Additionally, the system may include a rotatable counter for keeping track of the number of effective uses remaining in the filter system.

More particularly, according to one embodiment of the present invention, a disposable bottled water storage and filtration system, comprises a flexible plastic water bottle

having a threaded opening, a bottle cap having threads to attach to the threaded opening of the water bottle, a nozzle formed in a first side of the bottle cap, a nozzle lid formed on the bottle cap, a porous filter housing formed on a second side of the bottle cap, the filter formed as a cylinder and comprising slots; a filter located inside the porous filter housing, and a rotating counter attached to the porous filter housing, wherein the cap, nozzle, nozzle lid, filter, filter housing and rotating counter are formed as an integrated unit, which can be attached and removed from the water bottle as a unit.

During the squeezing action, the liquid passes through the activated carbon and micro-porous membrane filter of the filtering member, and is effectively sterilized and purified, to thereby easily provide a sterile liquid. Even when the liquid has an offensive odor or smell or when the liquid has an irritating odor of a sterilizer, such as hypochlorous acid, such an offensive or irritating odor can be effectively removed from the liquid owing to the function of the activated carbon when the liquid passes through the activated carbon and micro-porous membrane filter. As a result, the obtained sterile liquid is free of smell and is favorably used as a drinking water.

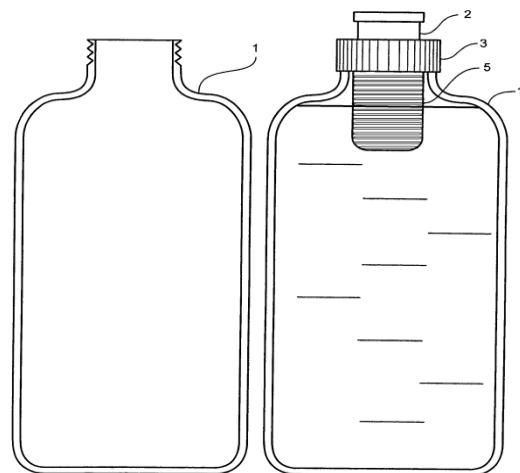


FIG. 1

FIG. 2

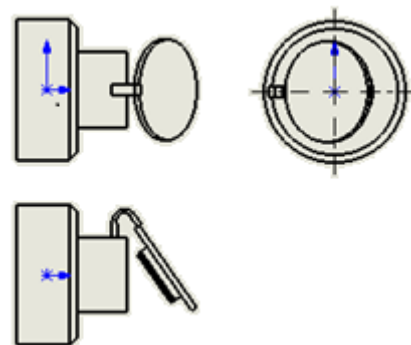


Figure 3

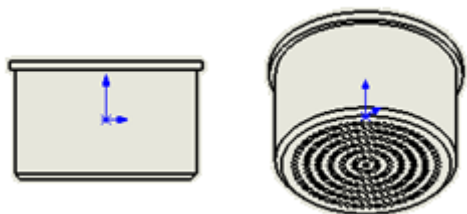


Figure 4

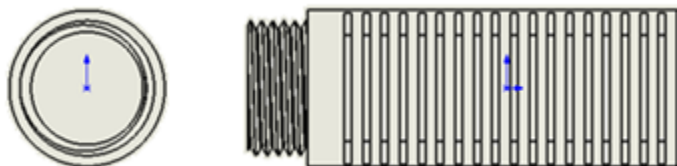


Figure 5

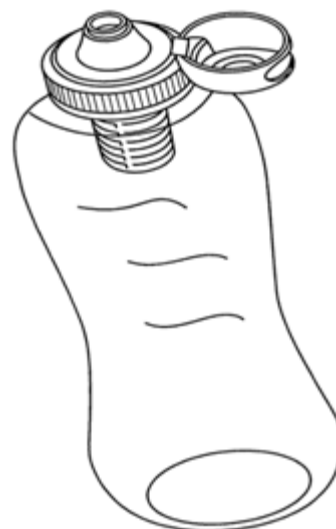


Figure 8

II. BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will be readily understood by the following detailed description in conjunction with the accompanying drawings, wherein like reference numerals designate like structural elements, and in which:

FIG.1 illustrates a disposable plastic bottle suitable for use with the present invention;

FIG.2 illustrates a first embodiment of the present invention of a disposable water bottle, and the integrated water filter;

FIG.3 is a side/bottom view of cap of the water filtration system.

FIG.4 is a side view of cap lid of cartridge of the water filtration system.

FIG.5 is a side/top view of cartridge of the water filtration system.

FIG.6 illustrates the filter inside the cartridge housing according to one embodiment of the present invention;

- a. illustrates a granulated carbon filter;
- b. illustrates a carbon filter;
- c. illustrates a pulverized or powdered carbon filter;
- d. illustrates a spun synthetic filter;
- e. illustrates a ceramic block filter;
- f. illustrates a pleated imbedded filtration paper;

FIG.7 is an exploded view of the cap and filter assembly of the embodiment of FIG.8

FIG.8 illustrates an alternative water bottle and filtration system embodiment.

III. DETAILED DESCRIPTION OF THE INVENTION

The following description is provided to enable any person skilled in the art to make and use the invention and sets forth the best modes contemplated by the inventor for carrying out the invention. Various modifications, however, will remain readily apparent to those skilled in the art. Any and all such modifications, equivalents and alternatives are intended to fall within the spirit and scope of the present invention.

The present invention is a disposable bottle of bottled water that is capable of reducing waste and thereby helps the environment by allowing the consumer to re-fill and re-use the

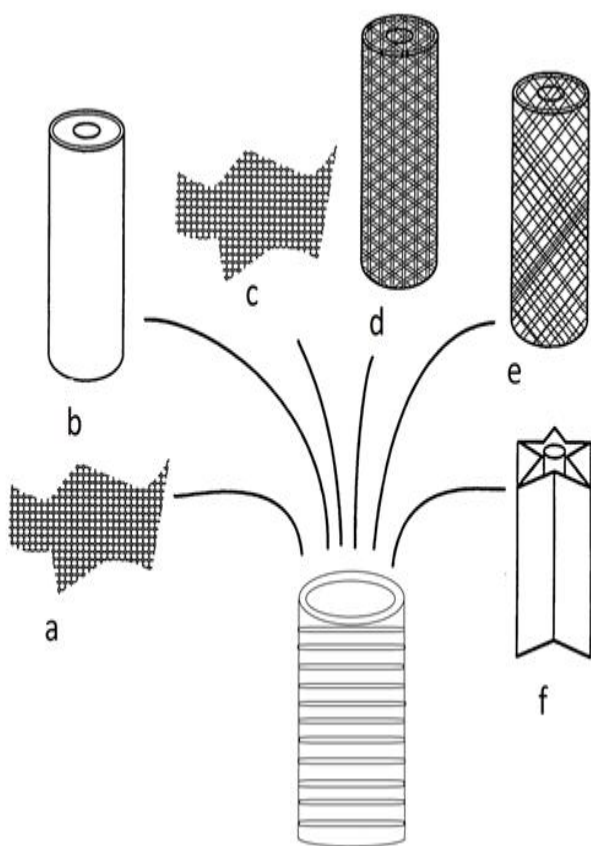


Figure 6

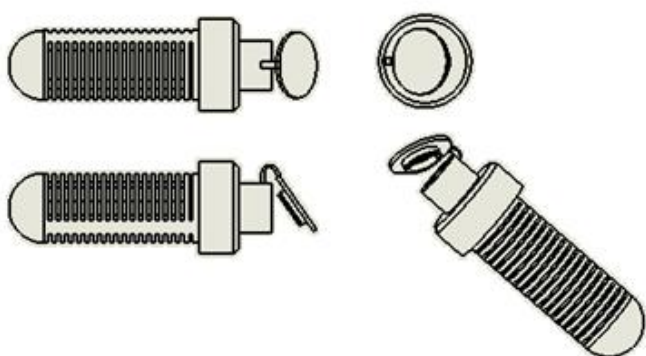


Figure 7

same bottle twenty times or more. The water bottle incorporates a lightweight, disposable and inexpensive filtration system within the water bottle cap. As described in further detail below, the present invention can be implemented in various ways, as illustrated by the various embodiments.

In a preferred implementation, the system is sold as “bottled water.” There are many types of water bottles on the market, but designing a system for use in pre-filled bottled water has certain challenges. Specifically, the design requires:

- Meeting FDA standards for a food product instead of EPA standards
- Filter miniaturization so that the filter can fit in the cap of bottled water containers
- A filter which does not release a large volume of carbon particles into the water (so a buyer does not see carbon particles in the bottled water on the shelf).
- A bottle design that works with high volume water filling machines.
- A cap size that works with automatic capping machine.

The present invention addresses these issues and provides a disposable bottled water container with integrated filtration that can be sold alongside other bottled water products, at a competitive price point.

FIG. 1 illustrates a standard disposable plastic water bottle 1 suitable for use in the present invention. In a preferred embodiment, the bottle 1 includes a threaded opening for attaching a bottle cap. As shown in FIG. 2, the bottle cap 3 incorporates a filter (not shown) in a filter housing 5. The filter housing 5 is formed with the cap 3, so that the cap and filter can be removed and re-attached to the bottle 1 as an integral unit. The cap 3 preferably includes threads for attaching the cap to the threaded opening of the water bottle 1.

In use, when the plastic bottle 1 is squeezed sufficient pressure is created that forces water through the filtration media located in the filter housing 5 and out of the opening at the top 2 of the bottle 1. When the bottle is empty, the cap 3 can simply be removed and the bottle re-filled with, for example, ordinary tap water. Since the bottle 1 incorporates its own filter system, the user can enjoy the benefits of filtered water, without disposing of the plastic water bottle 1 after just one use.

The bottle cap Fig. 3 can be removed out easily by twisting it and put the cap by refilling the water into the bottle.

The filter cap Fig. 4 contains small pores which are inserted into the top of the filter. This filter cap helps to holds the small minute dust particle and allows the clean water to flow.

Fig. 5 The filter housing is formed as a porous casing having elongated slots

Optionally, different types of filtration material may be used for the actual filter. A filter housing according to an embodiment of the present invention is shown in Fig. 6. Various alternative filters are shown in Fig. 6 a- 6 e. For example, (a) illustrates a granulated carbon filter; (b) illustrates a carbon filter; (c) illustrates a pulverized or powdered carbon filter; (d) illustrates a spun synthetic filter; (e) illustrates a ceramic block filter; and (f) illustrates a pleated imbedded filtration paper. The filter material may also include zeolites, antimicrobial additives, nano alumina, or combinations thereof. The levels and materials of the filtration

could vary in strength and performance depending on the local water conditions, wherever the bottled water may be sold.

Fig. 7 The nozzle may be engaged in the up position for dispensing or in a down or sealed position when not in use. The filter housing and the cap are combined and then attached and sealed onto the filled water bottle through the “capping” process commonly used by bottlers. The entire system, including bottle, cap and filtration system may be sold as one unit.

An alternative embodiment of the present invention is illustrated in Fig. 8 a disposable water bottle includes a cap, having an integrated filter (not shown) and filters housing. The cap includes a nozzle, and a nozzle cap. The operation of the system is similar to embodiment described above.

CONCLUSION

The Importance of Drinking Filtered Water: The threat of harmful contaminants in drinking water can no longer be reasonably ignored. The correlation between contaminated drinking water and many significant diseases and health problems is far too strong to discount.

Of course, municipal water treatment facilities have lowered the presence of many of the more harmful contaminants, and the EPA has set maximum contaminant levels, below which it is assumed that contaminants may be safely ingested into the body. Municipal treatments facilities are not infallible, and EPA levels do not represent a safety level for every person. Children, the elderly, and those individuals who already have weakened immune systems, are particularly at risk to drinking water contaminants. Two of the most volatile drinking water contaminants, chlorine and fluoride, are actually treatment additives. Also, lead, another of the more harmful contaminants, enters drinking water after treatment and cannot be regulated by municipal water systems. Therefore, municipal water systems cannot and should not be trusted to provide healthy, clean drinking water.

There are many home treatment alternatives that can purify drinking water to a greater extent than city treatment plants. Reverse osmosis and distillation, two of these alternatives, are moderately successful at removing some contaminants, but they are expensive and wasteful. Bottled water, besides being expensive and highly unfeasible as a main drinking water source, is not under the same government regulations as municipal water systems and may actually contain more contaminants than tap water. The absolute best technology now available for treating water and removing undesirable contaminants is water filtration. Water filters, when compared to any other water treatment alternative, will remove more contaminants and provide safer, healthier drinking water.

References

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