SYSTEM AND METHOD FOR ECO-FRIENDLY BEVERAGE DISPENSING KIOSK

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ABSTRACT

A beverage dispensing kiosk that contains empty beverage containers and fills them with water and other beverages. The beverage containers comply with applicable regulations and standards to be designated "compostable." The kiosk uses municipal water as the base, purifies the water, and adds constituents to meet the taste of the ultimate consumer. The delivered beverage may be commonly known as bottled water or as a soft drink, such as a cola beverage.
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CROSS-REFERENCE TO RELATED APPLICATION

[0001] This non-provisional application claims the benefit of provisional application No. 61/807,191, filed Apr. 1, 2013, which application is incorporated herein in its entirety by this reference.

TECHNICAL FIELD

[0002] One embodiment of the present invention is a water kiosk that solves the problem of water being sold in non-compostable bottles. The kiosk enables the provision to consumers of bottled water or beverage in an easily biodegradable—“compostable”—beverage container for use in the sale of bottled water and other beverages. The beverage kiosk fills the container onsite at the time of purchase. The kiosk filters municipal water to a high level of purity, provides additives if desired by the consumer, fills a compostable beverage container, seals the cap, and delivers the sealed bottled water to the consumer.

BACKGROUND

[0003] Water and other beverages are sold to consumer either in bottles or other containers that are not “compostable” or at dispensers that fill a container brought by the purchaser. Such containers create many environmental problems, including adding mass to landfills, ending up as litter in the environment that does not degrade under natural conditions, and creation of significant carbon emissions through the transport of pre-filled bottles from bottling sites to points of sale. Most such containers are composed of aluminum or polyethylene plastic (PET).

[0004] To date, no company has been able to develop and put into commercial production a beverage container that degrades easily in the natural environment—meeting various state, national, and international standards for “compostability.” The reason for this failure is that a beverage container that degrades easily must be sold immediately, because degradation begins immediately upon filling. Thus, beverages cannot be bottled, shipped, and stored at points of sale without degrading to the point where they are unacceptable to consumers.

SUMMARY OF THE INVENTION

[0005] The solution, the way to provide a “compostable” container, is to fill the bottle only when the consumer buys the product. Then, the consumer has sufficient time to consume the beverage before significant degradation occurs. Providing such a solution requires a container designed for efficient delivery to points of sale, efficient storage at the point of sale, and filling processes that guarantee sterility and quality via a sealed cap.

[0006] One embodiment of the invention is directed to an eco-friendly beverage dispensing kiosk that takes in water from a standard local water supply facility and that dispenses bottled beverage to consumers, comprising at least one filter that filters water from the standard local water supply facility to remove impurities and to obtain filtered water, and a housing that contains empty beverage containers, each of the containers comprising a compostable material. The kiosk further includes a mechanism that fills at least one of the empty beverage containers with a beverage that contains the filtered water, seals the at least one container with a cap, and delivers the filled at least one container to a beverage recipient.

[0007] Another embodiment is directed to an eco-friendly beverage dispensing method comprising receiving water from a standard local water supply facility; and filtering water from the standard local water supply facility to remove impurities and to obtain filtered water. The method further includes filling at least one empty beverage container with a beverage that contains the filtered water, the at least one empty beverage container comprising a compostable material; sealing the at least one container with a cap; and delivering the filled at least one container to a beverage recipient.

[0008] All patents, patent applications, articles, books, specifications, standards, other publications, documents and things referenced herein are hereby incorporated herein by this reference in their entirety for all purposes. To the extent of any inconsistency or conflict in the definition or use of a term between any of the incorporated publications, documents or things and the text of the present document, the definition or use of the term in the present document shall prevail.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] FIG. 1 is a diagram of a water kiosk with stored bottles, a filling mechanism, a delivery mechanism, and filters to illustrate one embodiment of the invention.

[0010] FIG. 2 is a diagram showing details of bottle storage and the filling mechanism of FIG. 1.

[0011] FIG. 3A is a cross-sectional view diagram showing a sealing plug and cap body, where the sealing plug is inserted partially into the cap body through a hole.

[0012] FIG. 3B is a perspective view of the sealing plug and cap body of FIG. 3A.

[0013] FIG. 3C is a cross-sectional view diagram showing a sealing plug and cap body, where the sealing plug is inserted completely into the cap body through the hole to form a permanently sealed combined cap assembly.

[0014] FIG. 3D is a perspective view of the permanently sealed combined cap assembly of FIG. 3C sealing plug and cap body.

[0015] FIG. 3E is a top view of the main cap body with the sealing plug removed where a hole at the center of the main cap body is for receiving the sealing plug that is to be inserted into the hole of the main cap body first partially and then completely after filling the bottle. FIG. 3 is useful for illustrating another embodiment of the invention.

[0016] FIG. 4A is a diagram showing the bottle and cap assembly in a filled and permanently sealed condition.

[0017] FIG. 4B is a diagram showing a bottle with the cap plug inserted partially and ready for filling.

[0018] FIG. 5 shows a network of kiosks connected by a communication network to a central computer that contains a database of information about the kiosks and the customers buying beverages from the kiosks.

[0019] For simplicity in description, identical components are labelled with the same numerals in this document.

DETAILED DESCRIPTION OF EXEMPLARY EMBODIMENTS

[0020] In one embodiment, the above described problems with producing compostable bottled water or beverage can be
alleviated by having a kiosk that uses the municipal water supply, filters the water, provides additives in accordance with consumer preferences, fills compostable bottles stored in the kiosk, and delivers a sealed, filled bottle to the consumer. In its preferred embodiment, which is but one of many alternatives, the beverage container consists of an external shell, internal pouch, and cap. Its shape is that of a typical beverage bottle. The shell may be of an easily degradable material such as wood or bamboo pulp. To keep the beverage from leaking through the shell, the beverage is contained within a waterproof pouch inside the shell. The pouch may consist of poly-lactic acid (PLA) in such thickness and of such type that it meets regulatory requirements to be certified as “compostable.” The cap may be a typical cap with threads to screw onto the top of the container or an alternative. The cap may be made of wood, PLA, or another material. See figures below for illustration. To meet regulatory requirements, the entire container, or just the shell and pouch, may be certified as “compostable” by certification organization Vincotte (Brussels, Belgium) or a similar entity.

In another embodiment, the shell consists of a cylindrical tube with a narrower opening on top and a bottom that is hinged and not attached when the containers are shipped to the point of sale. The point of sale may be a beverage kiosk or point of retail sale. The pouch may be attached at the top of the shell and to the hinged bottom so that the pouch does not collapse when the beverage is consumed. Because the hinged bottom is not attached at the time of shipping, the containers may be stacked efficiently, with several hundred containers able to be stacked and stored within a space within a kiosk housing that is smaller than the size of a typical vending machine (1x4x6 feet), and allowing for other equipment inside the housing.

In still another embodiment of the invention, the container is folded and shipped to the point of sale. As with stacking, having folded containers allows storage of several hundred containers within a kiosk housing the size of a typical vending machine.

In yet another embodiment of the invention, a data collection interface is employed to interface with the meter data collection system. A number of software applications for cleaning, validating and estimating data are employed. A message bus transfers data or information derived from the data between the data collection system, the data collection interface and the software applications. By employing a number of different software applications to perform the functions of cleaning, validating and estimating data, where the software applications communicate with one another and with the data collection interface through the message bus, efficiency and flexibility of the cleaning, validating and estimating functions performed by the software applications are improved.

In any embodiment, when a consumer purchases the beverage, the container is filled and delivered to the consumer or beverage recipient. In this document, the terms “purchaser,” “consumer” and “beverage recipient” are used interchangeably. In one embodiment, the container is delivered to the point of sale with a cap and seal attached to the top. The container is filled through the bottom, and the bottom is then attached to the rest of the shell, completing the final container. In another embodiment, the container is filled through the top, after which the cap is added. Following consumption, the consumer may discard the container in a bin labeled for compost.

In one embodiment, the above described problems of producing compostable bottled water or beverage can be alleviated by having a kiosk that uses the municipal water supply, filters the water, provides additives in accordance with consumer preferences, fills compostable bottles stored in the kiosk, and delivers a sealed, filled bottle to the consumer. In its preferred embodiment, which is but one of many alternatives, the beverage container consists of an external shell, internal pouch, and cap. Its shape is that of a typical beverage bottle. The shell may be of an easily degradable material such as wood or bamboo pulp. To keep the beverage from leaking through the shell, the beverage is contained within a waterproof pouch inside the shell. The pouch may consist of poly-lactic acid (PLA) in such thickness and of such type that it meets regulatory requirements to be certified as “compostable.” The cap may be a typical cap with threads to screw onto the top of the consumer or an alternative. The cap may be made of wood, PLA, or another material. See figures below for illustration. To meet regulatory requirements, the entire container, or just the shell and pouch, may be certified as “compostable” by Vincotte (Brussels, Belgium) or a similar entity.

FIG. 1 is a block diagram illustrating one embodiment of the invention. As shown in FIG. 1, the kiosk 1 contains the elements necessary to produce and deliver bottled water or other beverages to the purchaser. Water from a municipal water supply facility enters the kiosk via manifold 33 and is connected to filters 5 that remove impurities, including both inorganic chemicals and undesirable microbes. Bottles are stored in cartridge 3 prior to filling in stacks as shown in FIG. 2. The bottles are retrieved by a robot arm and placed in a carousel to be filled by filler 4 in FIG. 1. The water is delivered through tubes to filler 4, and then injected into the bottle. The filled bottle is sealed and delivered to the consumer through the delivery mechanism 2, as shown in FIG. 1.

FIG. 2 illustrates the storage and handling of bottles in this embodiment. The bottles are stored in stacks 41 in a partially-completed state in the kiosk, with their bottoms only partially attached. During the filling and sealing process, the bottoms are attached. Filling collar 42 of filler 4 injects water through a hole in a pre-installed cap to fill the bottles. The use of a carousel allows one bottle to be filled while another is taken by the robot arm from storage and added to the carousel. Another bottle can then be filled immediately with a short rotation of the carousel without waiting for the robot arm to retrieve a bottle from the stack.

FIGS. 3A-3E illustrate the cap system in a second embodiment to deliver the sealed bottle of an embodiment. In this embodiment, the cap has two parts: sealing plug 21 and cap body 22. Following manufacture of the sealing plug and cap body, the sealing plug is inserted partially into the cap body through hole 26 as illustrated in the cross-sectional view of FIG. 3A to form the partially sealed plug and cap body assembly 24 also shown in FIG. 3B in perspective. Four holes 27 are defined in the cap body as shown in FIGS. 3A and 3E. FIG. 3E is a top view of the main cap body with the sealing plug removed where a hole 26 at the center of the main cap body is for receiving the sealing plug that is to be inserted into the hole of the main cap body first partially and then completely after filling the bottle. This partially sealed plug and cap body assembly 24 is screwed onto the bottle at a centralized facility and the breakable paper or plastic seal 35 in FIG. 4B is attached via adhesive or as shrink-wrap commonly used in the industry. The partially sealed plug and cap body assem-
bly 24 is delivered to the kiosk already screwed onto the bottle as shown in FIG. 4B. The beverage is injected through the four holes 27 in partially sealed plug and cap body assembly 24. After filling, a solenoid (not shown) plunges the plug 21 completely into the cap body 22 to create the sealed plug and cap body assembly 25 shown in FIG. 3C. The assembly 25 is then a permanently sealed combined cap assembly having an appearance attractive to the consumer and similar to typical plastic bottle caps. The permanently sealed combined cap assembly 25 is shown in the perspective view in FIG. 3D, and in cross-section in FIG. 3C. In other words, the holes 27 through which water is injected are permanently sealed following the filling of the bottle. The Kiosk 1 also preferably includes a refrigeration unit in manifold 33 that chills the water before it is injected into the bottle. The filler 4, the refrigeration unit, the solenoid unit that seals the holes 27, and the robot arm that delivers the filled bottle to the recipient are collectively referred to herein as the "mechanism." To consume the beverage, the consumer will first need to break the seal 35 by unscrewing the cap and removing it from bottle 34. The bottle and cap assembly in a filled and permanently sealed condition is shown in FIG. 3A.

[0029] FIG. 4 illustrates a further embodiment, in which the kiosk has a QR reader or camera 68 to read a QR code displayed by the purchaser’s smart phone 6 in another embodiment. The QR code communicates the purchaser’s identity and other information such as payment preferences. The QR code may also be displayed on the tablet computer 9, or on the computer 8 instead of smart phone 6. A smart phone, a tablet computer and a laptop computer are referred to herein collectively as a handheld computer.

[0030] In a still further embodiment shown in FIG. 1, the purchaser may select additives for the water to be added following filtration and prior to filling the bottle. The selected additives are combined with the water in filler 4 and injected into the bottle. Additives selected by the end consumer are communicated from the handheld computer such as smart phone 6 via wireless communications to receiver 7. The handheld computer may also be tablet computer 10 or laptop computer 9. A wireless receiver similar to receiver 7 may be used to establish two-way communication between the kiosk and a centralized computer linked to or with a database providing information to the kiosk as illustrated in FIG. 5.

[0031] In a yet further embodiment illustrated in FIG. 1, the purchaser may communicate payment information such as identification and account number to the kiosk as well as authorization for payment for the filled container beverage by the purchaser’s financial institution on behalf of the purchaser. Payment information for the end consumer or purchaser is communicated from the handheld computer such as smart phone 6 via wireless communications to receiver 7. The handheld computer may also be tablet computer 10 or laptop computer 9.

[0032] In another further embodiment illustrated in FIG. 1, the kiosk has a computer processor 11 that can communicate with a payment processing computer (not shown) at a payment facility (not shown) via wireless link 7 to enable automatic deduction from a pre-paid account that was funded by the beverage recipient in advance of the purchase.

[0033] In a further embodiment illustrated in FIG. 1, the kiosk has computer processor 11 that contains or is linked to a database 12 of information about persons previously utilizing the kiosk. This database may be linked, to centralized database 13 illustrated in FIG. 5. In the embodiment illustrated in FIG. 5, the kiosk of FIG. 1 may be one of the kiosks 14, 15, 16 in and forms part of a network of kiosks 14, 15, and 16 that are connected via communications network 17 to a central database 13 connected to computer processor 28 and housed at centralized facility 31. The central database 13 contains in one embodiment information about persons previously utilizing any one of the kiosks that is part of the network of kiosks. Alternatively, the central database 13 may also be stored in the computer processor 28.

[0034] In yet another embodiment illustrated in FIG. 5, the kiosk produces bottled beverages without creating wastewater. Water is received through intake manifold 33 and passed through filters 5 before bottling. Only sufficient water is processed in order to fill a bottle. Any excess water is stored in filler 4 and utilized in filling a subsequent bottle. Filters 5 may include the use of ultraviolet light, or may include a reverse osmosis filter, or a charcoal filter, or any combination or subset of the three. In one embodiment, the charcoal filter requires no flushing, because it is replaced via maintenance activities before reaching full utilization.

[0035] In one more embodiment illustrated in FIG. 1, tubing carries water from manifold 33 to filler 4. The kiosk utilizes only tubing that allows no detectable leaching of impurities in the liquid as the liquid flows through the tubing. Such tubing may include some stainless steel tubing.

[0036] In yet another embodiment shown in FIG. 1, filler 4 includes tubes connected to additive containers stored in filler 4. The kiosk adds additives to the water via filler 4 during the filling process. The additives are selected by the recipient of the beverage. In one embodiment, the additive is one or more flavors. In other embodiments, the additive is carbonation, caffeine, or an additive that increases or decreases the pH of the beverage.

[0037] In an embodiment shown in FIG. 5, kiosk 14 has a wireless communications component (not shown but similar to wireless link 7 of FIG. 1) to communicate via communications network 17 to retrieve the beverage recipient’s preferred set of additives from database 13 housed at centralized facility 31 remote from the kiosk. This may be performed by means of the wireless communications component or receiver of kiosk 14 receiving wireless signals from a handheld computer of the recipient. The wireless signals may carry information about the purchaser’s preferred additives, and the mechanism adds the preferred additives to the water filtered from the standard local water supply facility before filling the at least one container.

[0038] FIG. 5 illustrates a further embodiment of the invention in which the kiosk is part of a network of kiosks and where a closed-loop maintenance system is used to maintain the kiosk. Such kiosks are connected to computer processor 28 at central facility 31 via communications network 17. The centralized database 13 is connected to computer processor 28. The database may contain information about the kiosks and number of beverage containers filled at each kiosk in the network. The database may also contain information about the history of the filters and pumps in each kiosk in the network.

[0039] FIG. 1 illustrates one further embodiment, in which bottles are stored in cartridge 3 prior to filling. The use of cartridges allows for efficient maintenance, because bottles can be pre-loaded into the cartridges at a central maintenance facility. The loaded cartridges can then be quickly exchanged.
in the kiosk, allowing for addition of hundreds of empty bottles with a minimum of manual labor and in a short time period.

While the invention has been described above by reference to various embodiments, it will be understood that changes and modifications may be made without departing from the scope of the invention, which is to be defined only by the appended claims and their equivalents.

It is claimed:

1. A eco-friendly beverage dispensing kiosk that takes in water from a local water supply facility and that dispenses bottled beverage to consumers, comprising:
   - at least one filter that filters water from the local water supply facility to remove impurities and to obtain filtered water;
   - a housing that contains empty beverage containers, each of said containers comprising a compostable material; and a mechanism that fills at least one of the empty beverage containers with a beverage that contains the filtered water, seals the at least one container with a cap, and delivers the filled at least one container to a beverage recipient.

2. The kiosk of claim 1, where the cap is sealed to the at least one container with a seal that the beverage recipient must break prior to drinking the beverage.

3. The kiosk of claim 1 where the top of the cap includes a hole therein, and the at least one container is filled through the hole in the cap.

4. The kiosk of claim 3 where the hole in the cap is permanently sealed following the filling of the beverage container.

5. The kiosk of claim 1, further comprising a refrigeration device that chills the water from the standard local water supply facility before the at least one container is filled.

6. The kiosk of claim 1, further comprising a camera that can read QR codes displayed by a handheld computer.

7. The kiosk of claim 6 where the handheld computer is a smart phone, a tablet computer or a laptop computer.

8. The kiosk of claim 1, further comprising a wireless receiver receiving wireless signals from a handheld computer of the recipient, said wireless signals carrying information about the purchaser's preferred additives, wherein the mechanism adds the preferred additives to the water filtered from the local water supply facility before filling the at least one container.

9. The kiosk of claim 10 where the handheld computer is a smart phone, a tablet computer, or a laptop computer.

10. The kiosk of claim 1, further comprising a wireless receiver receiving wireless signals from a handheld computer of the recipient, said wireless signals authorizing payment for the filled at least one container by a financial institution on behalf of the recipient.

11. The kiosk of claim 14 where the handheld computer is a smart phone, a tablet computer or a laptop computer.

12. The kiosk of claim 1, further comprising a computer processor that can communicate with a payment processing computer to enable automatic deduction from a pre-paid account that was funded by the beverage recipient in advance of a purchase.

13. The kiosk of claim 1, further comprising a computer processor that contains a database of information about persons previously utilizing the kiosk.

14. The kiosk of claim 1 wherein the kiosk is part of a network of kiosks that are connected via a communications network to a central database of information about persons previously utilizing the kiosk or another kiosk that is part of the network of kiosks.

15. The kiosk of claim 1, further comprising a wireless or other communications device to communicate two ways between the kiosk and a centralized computer with a database providing information to the kiosk.

16. The kiosk of claim 1 where no wastewater is produced in the process of filling the beverage container.

17. The kiosk of claim 1 where filtering is performed via an ultraviolet light or reverse osmosis.

18. The kiosk of claim 1 where filtering is performed with a carbon filter.

19. The kiosk of claim 18 where no water is used to flush the carbon filter.

20. The kiosk of claim 1, further comprising tubing to carry liquid wherein said tubing allows no detectable leaching of impurities in the liquid as the liquid flows through the tubing.

21. The kiosk of claim 20 where at least some of the tubing is composed of stainless steel.

22. The kiosk of claim 1 where the mechanism adds additives to the filtered water, wherein the additives added are selected by the recipient of the beverage.

23. The kiosk of claim 22 where the additive is one or more flavors.

24. The kiosk of claim 22 where the additive is carbonation.

25. The kiosk of claim 22 where the additive is caffeine.

26. The kiosk of claim 22 where the additive increases or decreases the pH of the beverage.

27. The kiosk of claim 22, further comprising a wireless communications component that can retrieve beverage recipient’s preferred set of additives from a database linked to or stored on another computer remote from the kiosk.

28. The kiosk of claim 1, further comprising a closed-loop maintenance system to maintain the kiosk.

29. The kiosk of claim 28, wherein the kiosk is part of a network of kiosks that are connected via a communications network to a central database wherein the central database contains information about the kiosk in the network and number of beverage containers filled at each kiosk in the network.

30. The kiosk of claim 29 where the central database contains information about all service calls to each kiosk in the network.

31. The kiosk of claim 28 where the central database contains information about the history of filters and pumps in each kiosk in the network.

32. The kiosk of claim 1 wherein the containers are delivered to the kiosk in pre-filled cartridges.

33. An eco-friendly beverage dispensing method comprising:
   - receiving water from a local water supply facility;
   - filtering water from the standard local water supply facility to remove impurities and to obtain filtered water;
   - filling at least one empty beverage container with a beverage that contains the filtered water, the at least one empty beverage container comprising a compostable material;
sealing the at least one container with a cap, and
delivering the filled at least one container to a beverage
recipient.