A method and apparatus for filling beverage bottles, in a beverage bottling plant, with a beverage material comprising a carbonated water component and a liquid flavoring component, and method and apparatus for filling containers, in a container filling plant, with a material comprising a first ingredient and a second ingredient.

Related U.S. Application Data

METHOD AND APPARATUS FOR FILLING BEVERAGE BOTTLES, IN A BEVERAGE BOTTLING PLANT, WITH A BEVERAGE MATERIAL COMPRISING A CARBONATED WATER COMPONENT AND A LIQUID FLAVORING COMPONENT, AND METHOD AND APPARATUS FOR FILLING CONTAINERS, IN A CONTAINER FILLING PLANT, WITH A MATERIAL COMPRISING A FIRST INGREDIENT AND A SECOND INGREDIENT

CONTINUING APPLICATION DATA


BACKGROUND

[0002] 1. Technical Field

[0003] The present application relates to a method and apparatus for filling beverage bottles, in a beverage bottling plant, with a beverage material comprising a carbonated water component and a liquid flavoring component, and method and apparatus for filling containers, in a container filling plant, with a material comprising a first ingredient and a second ingredient.

[0004] 2. Background Information

[0005] Background information is for informational purposes only and does not necessarily admit that subsequently mentioned information and publications are prior art.

[0006] The present application relates to a method for the filling of bottles or similar containers with a liquid comprising at least two ingredients. The ingredients are mixed with one another during the filling of the container of the individual container, and the mixing ratio of the ingredients is controlled by measuring the quantity of at least one ingredient fed into the individual container with a flow meter. The present application also relates to a filling system for the filling of bottles or similar containers with a liquid that comprises at least two ingredients. The ingredients are mixed with one another during the filling of the respective container. The filling system comprises at least one filling element with a discharge opening for the dispensing of the liquid being bottled in the individual container. The discharge opening can be placed in communication via a liquid path. The filling system further comprises a dosing valve arrangement with bowls or chambers, each of which houses one ingredient corresponding to the mixing ratio of the ingredients in the container.

[0007] The present application relates to a method for the filling of containers with a liquid being bottled which consists of at least two ingredients, namely for example a basic ingredient and an additional ingredient, whereby the ingredients are mixed with each other during the filling process. Methods of this type are known in the beverage industry.

[0008] In one such method, the mixing of two ingredients which, when mixed, form the finished liquid or beverage, takes place in a dosing chamber which is realized in a housing of the respective filling element. By means of a dosing valve arrangement which is formed by two controllable dosing valves, the liquid ingredients are fed to the dosing chamber in the quantity in the volume required to achieve the desired mixing ratio, and for example under the control of a level sensor which is located in the dosing chamber. After the mixing of the ingredients in the dosing chamber, the finished beverage is introduced into the individual container by opening a liquid valve. This method is intended for the filling of cans and is not suitable for the filling of containers, for example containers made of glass with empty volumes that fluctuate significantly, because with this method it is not possible to achieve a constant fill level.

[0009] Some methods and filling systems involve the mixing of the ingredients which is controlled on the basis of quantity or volume, and for example with the use of an independent flow meter for each ingredient on each filling element. On filling machines that employ a rotary construction with high capacity and have a plurality of filling elements, these designs require or desire a significant effort in terms of construction.

OBJECT OR OBJECTS

[0010] An object of the present application is to describe a method for the filling of bottles or similar containers with a liquid that is produced by the mixing of at least two ingredients, which (method) makes it possible to accomplish this filling with reduced effort and expense in terms of construction. The present application teaches that this object can be accomplished by a method for filling bottles or similar containers with a liquid consisting of at least two ingredients, whereby the ingredients are mixed with one another during the filling of the respective container and the mixing ratio of the ingredients is controlled by measurement of the quantity of at least one ingredient fed into the respective container by a flow meter. The mixing of the ingredients takes place in the individual container, and that the mixing of the ingredients takes place during the filling so that at least one ingredient is fed into the individual container using the flow meter to control the quantity or volume. The ingredient fed into the container at the end of the filling process is introduced into the container to control the fill level. The present application also teaches that this object can be accomplished by a method for the filling of bottles or similar containers with a liquid comprising at least two ingredients, whereby the ingredients are mixed with one another during the filling of the individual container and the mixing ratio of the ingredients is controlled by measuring the quantity of at least one ingredient fed into the individual container with a flow meter. The mixing of the ingredients takes place in the individual container, and that to control the mixing ratio for the at least two ingredients a common flow meter is used, through which these ingredients flow at different times.

SUMMARY

[0011] In one basic realization of the present application, the mixing of the ingredients takes place in the individual container, whereby the filling of the respective container, i.e. the controlled, dosed dispensing of at least two ingredients in the quantity or volume required for the desired mixture, takes place with the use of a single flow meter which is associated with the individual filling position or the individual filling element. Because on a filling machine with a
plurality of filling systems or filling elements, only one such flow meter is required for each filling element, the filling of even more than one ingredient of a liquid that is formed by mixing is possible without an elevated construction expense and with overall reduced costs.

[0012] The present application teaches that the filling is controlled on the basis of quantity or volume, i.e. on the basis of the quantity of the ingredients that when mixed form the liquid to be bottled, as measured by the respective flow meter and flowing into the respective container. The ingredients are introduced into the individual container either sequentially one after the other or at different times. The mixing of the ingredients takes place in the container.

[0013] It is thereby possible in one possible embodiment, to achieve a more thorough mixing of the ingredients in the individual container, to introduce the individual ingredients into the container multiple times in alternation. The filling process can then also be ended in the volume control system, for example, when the total volume of the ingredients introduced into the individual container equals the desired quantity to be bottled.

[0014] Basically it is also possible to end the filling process prematurely on the basis of the level control. In one possible embodiment, the liquids being bottled are to be bottled in glass containers or bottles using a hot bottling process, because the empty volume of glass containers fluctuates greatly as a result of manufacturing tolerances, for example, and a purely volume-controlled filling would result in very different fill levels, which would be unacceptable to the final consumer.

[0015] It is hereby also possible, for at least a partial filling of the container, to perform a filling that is controlled on the basis of quantity or volume and then to perform a level-controlled filling for the ingredient which is introduced last or for the partial filling, and of course taking into consideration the average empty volume of the containers and of the desired mixing ratio, in which case, for example, a filling of only one ingredient based on quantity or volume is performed using the flow meter, and the second ingredient is introduced with a control of the fill level.

[0016] In an additional basic realization of the present application, the mixing of the ingredients takes place outside the individual container in a mixing chamber of the respective filling system filling element before the liquid is introduced into the container. The special feature of this method, however, is that the filling of the container from the mixing chamber is controlled on the basis of the fill level.

[0017] The means that determine the fill level in the individual container which form the outlet of the mixing chamber or the fluid valve of the filling element which is in communication with this outlet during the filling are then closed when the specified or desired fill level in the container is reached.

[0018] The means that determine the fill level are thereby, for example, at least one probe which extends into the container in question at least during the filling process, with at least one probe contact and/or one return gas tube or a notch in the tube. The volume of the mixing chamber is thereby designed so that it is in all cases slightly greater than the empty volume of the bottles or containers to be processed. This realization also essentially ensures or promotes a constant or substantially constant fill level of the liquid in the containers when the ingredients are mixed in a mixing chamber outside the individual container, in one possible embodiment in containers whose empty volume fluctuates significantly from one container to the next.

[0019] The above-discussed embodiments of the present invention will be described further herein below. When the word "invention" or "embodiment of the invention" is used in this specification, the word "invention" or "embodiment of the invention" includes "inventions" or "embodiments of the invention", that is the plural of "invention" or "embodiment of the invention". By stating "invention" or "embodiment of the invention", the Applicant does not in any way admit that the present application does not include more than one patentably and non-obviously distinct invention, and maintains that this application may include more than one invention, and, in the event that there is more than one invention, that these inventions may be patentable and non-obvious one with respect to the other.

**BRIEF DESCRIPTION OF THE DRAWINGS**

[0020] Developments of the present application are described according to the present application. The present application is explained in greater detail below with reference to the possible embodiments illustrated in the accompanying figures, in which:

[0021] FIGS. 1 through 3 are each simplified illustrations of a filling element of a filling machine that employs a rotary construction, together with two bowls for different liquids to be bottled, with different embodiments of the present application;

[0022] FIG. 2A shows a simplified probe contact of a filler tube of one possible embodiment of the application;

[0023] FIG. 4 is a simplified illustration of the flow meter associated with the individual filling element, together with a 3/2 way valve integrated into this flow meter;

[0024] FIG. 5 is an illustration like FIG. 1 of an additional embodiment of the filling system according to the present application; and

[0025] FIG. 6 shows schematically the main components of one possible embodiment example of a system for filling containers, specifically, a beverage bottling plant for filling bottles with at least one liquid beverage, in accordance with at least one possible embodiment, in which system or plant could possibly be utilized at least one aspect, or several aspects, of the embodiments disclosed herein.

**DESCRIPTION OF EMBODIMENT OR EMBODIMENTS**

[0026] FIG. 1 shows a filling element 1 of a filling system of a machine that employs a rotary construction and is used to fill bottles 2 or similar containers with a liquid which is composed of two ingredients which are mixed with each other only in the individual bottle 2. One ingredient can be, for example, an additive in the form of a liquid flavoring such as syrup, and the other ingredient can be the basic ingredient such as carbonated water, e.g. mineral water. The filling element 1 is provided with a plurality of identical or similar filling elements 1 on the periphery of a rotor 3 which is driven in rotation around a vertical machine axis and on which there are, among other things, two bowls 4 and 5 that serve all the filling elements in common, whereby each bowl contains one ingredient of the liquid being bottled, for example the bowl 4 for the additive and the bowl 5 for the basic ingredient.
In a filling element housing of each filling element, a liquid duct is realized, the inlet of which is in communication via a flow meter and a connecting line with the outputs of two dosing valves and which can be actuated by an electrical control device. The dosing valves and which are individually actuated by the control device between an initial closed position and an open position in a manner which is described in greater detail below, are connected with their inputs to each bowl, and in one possible embodiment the dosing valve to the bowl and the dosing valve to the bowl.

Therefore a flow meter and the valve system that has the two dosing valves and is associated with each filling element of the filling machine.

The flow meter is realized in the form of an MID, i.e. a contactless, magnetically inductive flow meter which in a known manner generates a magnetic field in a measurement duct through which the liquid flows, which magnetic field induces an electrical voltage as a result of the electrically conductive liquid flowing through this measurement duct which is proportional to the flow quantity and is analyzed as the measurement signal that determines the flow quantity.

Associated with each filling element is a container which is also located on the rotor, in which the individual bottle is held suspended by a flange which is realized in the vicinity of the bottle mouth and, namely so that the bottle mouth faces the dispensing opening at some distance from it.

In the liquid duct, which emerges at its lower end in FIG. 1 at a discharge opening that is equipped with a gas lock, there is a liquid valve, the valve body of which is actuated with an actuator device and is controlled by the control device, so that the liquid valve opens at the beginning of the filling process and closes at the end of the filling process.

To achieve the desired mixing ratio of the two ingredients of the liquid being bottled in the individual bottle, the dosing valves and are opened by the control device, taking into consideration the quantities measured by the flow meter, whereby when the one dosing valve is open, the other dosing valve respectively is closed. In the simplest case, the control system operates so that at the beginning of each filling process and when the liquid valve is open, the dosing valve is opened, and is closed again after a certain length of time has passed, taking into consideration the quantity of liquid measured by the flow meter, the volume of the bottle and the desired mixing ratio of the ingredients. Then the bottle is filled by opening the dosing valve with the second ingredient (e.g. the basic ingredient), until the required or desired quantity of the liquid is introduced into the bottle and a corresponding signal from the flow meter via the control device causes the closing of the dosing valve and of the liquid valve as a function of the volume. The liquid valve is thereby in one possible embodiment closed before the dosing valve, to prevent, restrict, and/or minimize the connecting or communicating duct from running empty and to achieve clear and always or substantially always identical initial conditions for the start of each filling process.

To improve the mixing of the two ingredients of the liquid being bottled in the individual bottle, the filling process can also be controlled so that partial amounts of the required and/or desired total amounts of the ingredients of the liquid being bottled are introduced into the bottle by multiple openings and closings of the dosing valves and whereby the partial amounts of the ingredients measured by the flow meter are added up in the control device, and the maintenance of the desired mixing ratio is thereby monitored and controlled.

If the bottles have different volumes, for example as the result of manufacturing tolerances as is usually the case with glass bottles, and if a filling as a function of the volume is therefore unable to achieve a constant or essentially constant fill level, a probe which is very schematically indicated in FIG. 1 is introduced into the individual bottle to monitor the fill level and to terminate the filling process. In other words, a closing of the liquid valve takes place when the desired fill level has been reached, i.e. the process is controlled as a function of the fill level. The fill level can thereby be set, for example, using that ingredient of the liquid being bottled which is introduced into the respective bottle in any case at the conclusion of the filling process, i.e. in the case described above the basic ingredient from the bowl.

FIG. 2 shows an additional example a filling element of a filling machine that employs a rotary construction. The filling element which is in turn provided together with a plurality of identical filling elements on the rotor of this machine, differs from the filling element in the aspect that is of interest here essentially in that it is realized with a long filling tube, which emerges on its upper end into the liquid duct which is provided in the filling element housing and has the liquid valve and with its lower end forms the discharge opening. During the filling process, the individual bottle is pressed by means of its mouth and a container carrier which is realized in the form of a bottle plate until it comes into seal contact against the underside of the filling element or against a seal which is located there, and is in communication by means of an annular gap that surrounds the filling tube with a return gas path.

By opening the liquid valve and by a controlled opening and closing of the dosing valves and taking into consideration the quantity of fluid measured by the flow meter for the ingredients, these ingredients are introduced into and mixed in the individual bottle, and in one possible embodiment in the desired mixing or quantitative ratio. In this embodiment, the filling tube is provided with at least one probe contact by means of which the level of the liquid is determined, i.e. one of the two ingredients, namely the last ingredient introduced into the bottle, is fed via the filling element until the probe contact responds when the liquid valve closes and the subsequent closing of the dosing valve and thus achieves the required and/or desired fill level.

FIG. 2A shows a close up of one possible embodiment of a probe or fill level sensor on a filler tube of the filling element of the present application. As seen in FIG. 2A, the filler tube comprises a probe contact. The probe contact is disposed as a ring around the outside surface of the filler tube. The probe contact is configured as part of an open circuit. A wire runs from the probe contact to a sensor. The wire and the probe contact are insulated from the filler tube. When a liquid or liquid or liquid material comes into contact with the probe contact, the liquid material completes the circuit between the probe contact and the filler tube. The sensor is configured to sense when the circuit is completed or closed.
The sensor 50 sends a signal to a controller or control device 112 to end the discharge of the liquid material into the bottle 2.

[0038] When the filler tube 21 is disposed inside the container 2 for closed jet filling of the container 2, the liquid material enters the bottle 2 and fills the bottle 2. Once the liquid material fills the container 2 and reaches the probe contact 24 on the filler tube 21, the liquid material completes the circuit. The sensor 50 detects that the circuit is closed, and the filling of the bottle 2 is stopped.

[0039] In an additional realization of the present application, FIG. 3 shows a filling system with a filling element 1b which is provided in turn with a plurality of identical or similar filling elements on the periphery of a rotor of a filling machine that employs a rotary construction and which is used for the filling of the bottles 2 under counterpressure with the liquid formed by the two liquid ingredients. The individual bottle 2 is thereby pressed in sealed contact during the filling by means of its bottle mouth 2.1 against the discharge opening which is realized on the underside of the filling element housing 6 and a discharge opening that surrounds in a ring shape a return gas tube 25, or against a seal 27 which is located around the dispensing opening, and in one possible embodiment is held by the container carrier 28 on which the bottle 2 is held suspended by its flange 2.2. The return gas tube 27 forms, among other things, the valve body of the liquid valve 16 and is in communication with its upper end via gas paths which are controlled by control valves 29 and a ring-shaped gas duct 30 which is common to the filling elements 1b of the filling machine with the gas chambers 4.1 and 5.1. formed in the bowls 4 and 5 respectively, as well as with another gas duct 31 which can lead to the atmosphere, for example.

[0040] The controlled dispensing of the two ingredients of the liquid being bottled and the mixing of these ingredients in the respective bottle 2 takes place in this embodiment in a manner similar to the one described for the filling system illustrated in FIG. 1, and in one possible embodiment by the controlled opening and closing of the dosing valves 12 and 13 as a function of the flow quantity measured by the flow meter 9, although the fill level is determined by the return as tube 25, i.e. the level of the liquid ingredients introduced into the individual bottle 2 at the end of the filling process is terminated when the lower, open end of the return gas tube 25 is immersed in the rising level of the liquid in the respective bottle 2.

[0041] The realizations described above therefore have the following features, among others, in common:

[0042] The mixing of the ingredients of the liquid being bottled takes place in the individual bottle 2.

[0043] For each filling system or filling element 1, 1a, 1b, one single flow meter 9 is required and/or desired.

[0044] To achieve the desired mixing ratio between the ingredients, the dosing valves 12 and 13 of the valve arrangement 14 are controlled as a function of the respective flow quantity measured by the flow meter 9 and also in consideration of the volume of the respective bottle 2.

[0045] In the illustration in FIGS. 1 through 3, the connection 10 is shown relatively long for ease of understanding. In the practical realization of the filling systems or filling machines, however, the dosing valves 12 and 13 are located with their outputs as close as possible to the inlet of the flow meter 9, so that there is a small remaining volume for the flow path between the dosing valves 12 and 13 and the flow meter 9, which represents an essential contribution to improving the precision of the mixing of the two ingredients.

[0046] FIG. 4 shows, in a simplified illustration, a flow meter 31 with an integrated 3/2 way valve 32, the inputs 33 and 34 of which are each in communication with a respective chamber 4 and 5 and via which the chambers 4 and 5 can optionally be placed in communication with the flow meter 31 or with the fluid duct 7 which has the flow meter or is connected to the flow meter of the respective filling element 1, 1a, or 1b. In the position of the dosing valve 32 illustrated in FIG. 4, the connection to the two chambers 4 and 5 is closed.

[0047] FIG. 5 is a simplified illustration of a filling element 1c of a filling system in which the mixing of the two ingredients takes place outside the respective bottle 2 in a mixing chamber 36 of the filling element 1c, and namely in the illustrated embodiment, the fill level is controlled by a sensor 37 which is located in the mixing chamber 36. The mixing chamber 36 is in communication with its input 38 via the dosing valves 12 and 13 with the respective bowl 4 or 5. To mix the two ingredients that form the liquid being bottled, these dosing valves 12 and 13 are again opened and closed one after the other under the control of the signal from the sensor 37 so that the mixing of the ingredients at the desired mixing ratio is achieved in the mixing chamber 36. To achieve an unambiguous fill level in the respective bottle 2 in spite of the use of the mixing chamber 36, the liquid valve 16c is closed under the control of the fill level, and namely by a probe 39 which is equipped with at least one probe contact which is located in the bottle 2 during the filling process.

[0048] In the embodiment illustrated in FIG. 5, the filling element 1c, which is in turn provided with a plurality of identical filling elements on the periphery of a rotor of a filling machine which employs a rotary construction, is realized for an open jet filling. Of course the filling element can also be realized for other filling methods, for example for a filling with a long fill tube or for a filling under counterpressure, whereby in the latter case the fill level in the bottle 2 and/or the closing of the liquid valve 16c are in turn controlled by a return gas tube which corresponds to the return gas tube 25.

[0049] In this embodiment it is also possible to carry out a mixing of the ingredients in the mixing chamber 36 as a function of the volume, and in one possible embodiment by providing a flow meter which corresponds to the flow meter 9 at the inlet to the mixing chamber 36, or by connecting the inlet 38 of the mixing chamber 36 via the flow meter 32 with the integrated 3/2 way valve 32 to the bowl 4 or 5 respectively.

[0050] The present application was described above on the basis of possible embodiments. It goes without saying that numerous modifications and variations can be made without thereby going beyond the teaching of the present application.

[0051] For example, the filling system or the corresponding filling machine can also be realized so that more than two bowls are used, in which case one bowl then houses the basic ingredient of the liquid to be bottled, such as the beverage being bottled, for example, and the other bowl houses the liquid additives that are to be mixed in with the basic ingredient.

[0052] It is also possible during the filling operation of the filling machine to control individual filling systems comprising the respective filling element, the flow meter and the dosing valve, so that some of the containers or bottles are filled with the basic ingredient and with an additive ingredi-
ent, and other containers or bottles are filled with the basic ingredient and with the additive ingredient, and/or with the basic ingredient.

**FIG. 6** shows schematically the main components of one possible embodiment example of a system for filling containers, specifically, a beverage bottling plant for filling bottles 130 with at least one liquid beverage, in accordance with at least one possible embodiment, in which system or plant could possibly be utilized at least one aspect, or several aspects, of the embodiments disclosed herein.

**FIG. 6** shows a rinsing arrangement or rinsing station 101, to which the containers, namely bottles 130, are fed in the direction of travel as indicated by the arrow 131, by a first conveyor arrangement 103, which can be a linear conveyor or a combination of a linear conveyor and a starwheel. Downstream of the rinsing arrangement or rinsing station 101, in the direction of travel as indicated by the arrow 131, the rinsed bottles 130 are transported to a beverage filling machine 105 by a second conveyor arrangement 104 that is formed, for example, by one or more starwheels that introduce bottles 130 into the beverage filling machine 105.

**FIG. 6** shows a revolving arrangement or rotary design, with a rotor 105, which revolves around a central, vertical machine axis. The rotor 105 is designed to receive and hold the bottles 130 for filling at a plurality of filling positions 103 located about the periphery of the rotor 105. At each of the filling positions 103 is located a filling arrangement 114 having at least one filling device, element, apparatus, or valve. The filling arrangements 114 are designed to introduce a predetermined volume or amount of liquid beverage into the interior of the bottles 130 to a predetermined or desired level.

**FIG. 6** shows the filling arrangements 114 receive the liquid beverage material from a toroid or annular vessel 117, in which a supply of liquid beverage material is stored under pressure by a gas. The toroidal vessel 117 is a component, for example, of the revolving rotor 105. The toroidal vessel 117 can be connected by means of a rotary coupling or a coupling that permits rotation. The toroidal vessel 117 is also connected to at least one external reservoir or supply of liquid beverage material by a conduit or supply line. In the embodiment shown in **FIG. 6**, there are two external supply reservoirs 123 and 124, each of which is configured to store either the same liquid beverage product or different products. These reservoirs 123, 124 are connected to the toroidal or annular vessel 117 by corresponding supply lines, conduits, or arrangements 121 and 122. The external supply reservoirs 123, 124 could be in the form of simple storage tanks, or in the form of liquid beverage product mixers, or at least one possible embodiment.

**FIG. 6** shows as well as the more typical filling machines having one toroidal vessel, it is possible that in at least one possible embodiment there could be a second toroidal or annular vessel which contains a second product. In this case, each filling arrangement 114 could be connected by separate connections to each of the two toroidal vessels and have two individually-controllable fluid or control valves, so that in each bottle 130, the first product or the second product can be filled by means of an appropriate control of the filling product or fluid valves.

**FIG. 6** shows downstream of the beverage filling machine 105, in the direction of travel of the bottles 130, there can be a beverage bottle closing arrangement or closing station 106 which closes or caps the bottles 130. The beverage bottle closing arrangement or closing station 106 can be connected by a third conveyor arrangement 107 to a beverage bottle labeling arrangement or labeling station 108. The third conveyor arrangement may be formed, for example, by a plurality of starwheels, or may also include a linear conveyor device.

In the illustrated embodiment, the beverage bottle labeling arrangement or labeling station 108 has at least one labeling unit, device, or module, for applying labels to bottles 130. In the embodiment shown, the labeling arrangement 108 is connected by a starwheel conveyor structure to three output conveyor arrangements: a first output conveyor arrangement 109, a second output conveyor arrangement 110, and a third output conveyor arrangement 111, all of which convey filled, closed, and labeled bottles 130 to different locations.

The first output conveyor arrangement 109, in the embodiment shown, is designed to convey bottles 130 that are filled with a first type of liquid beverage supplied by, for example, the supply reservoir 123. The second output conveyor arrangement 110, in the embodiment shown, is designed to convey bottles 130 that are filled with a second type of liquid beverage supplied by, for example, the supply reservoir 124. The third output conveyor arrangement 111, in the embodiment shown, is designed to convey incorrectly labeled bottles 130. To further explain, the labeling arrangement 108 can comprise at least one beverage bottle inspection or monitoring device that inspects or monitors the location of labels on the bottles 130 to determine if the labels have been correctly placed or aligned on the bottles 130. The third output conveyor arrangement 111 removes any bottles 130 which have been incorrectly labeled as determined by the inspecting device.

The beverage bottling plant can be controlled by a central control arrangement 112, which could be, for example, computerized control system that monitors and controls the operation of the various stations and mechanisms of the beverage bottling plant.

Method for the filling of bottles or similar containers with a liquid being bottled which comprises at least two ingredients, whereby the ingredients are mixed with each other during the filling process and in one possible embodiment controlled by the measurement of the quantity of at least one ingredient which is introduced into the container by means of a flow meter.

One feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in a method for filling bottles or similar containers 2 with a liquid comprising at least two ingredients, whereby the ingredients are mixed with one another during the filling of the respective container 2 and the mixing ratio of the ingredients is controlled by measurement of the quantity of at least one ingredient fed into the respective container 2 by a flow meter 9, 32, wherein the mixing of the ingredients takes place in the individual container 2, and that the mixing of the ingredients takes place during the filling so that at least one ingredient is fed into the individual container 2 using the flow meter 9, 32 to control the quantity or volume, and that the ingredient fed into the container 2 at the end of the filling process is introduced into the container 2 to control the fill level.

Another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the method, wherein with two ingredients, the ingredient introduced at the beginning of the filling is controlled as a function of quantity or volume.
Yet another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in a method for the filling of bottles or similar containers 2 with a liquid comprising at least two ingredients, whereby the ingredients are mixed with one another during the filling of the individual container 2 and the mixing ratio of the ingredients is controlled by measuring the quantity of at least one ingredient fed into the individual container 2 with a flow meter 9, 32, wherein the mixing of the ingredients takes place in the individual container 2, and that to control the mixing ratio for the at least two ingredients a common flow meter 9, 32 is used, through which these ingredients flow at different times.

Still another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the method, wherein the mixing of the ingredients during the filling takes place so that all or substantially all or most of the ingredients are fed to the individual container 2 using the common flow meter 9, 32 and are controlled in terms of quantity or volume.

A further feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the method, wherein the mixing of the ingredients during the filling takes place so that at least one ingredient is fed to the individual container 2 using the flow meter 9, 32 and is controlled in terms of quantity or volume, and that the ingredient that is introduced at the end of the filling of the container 2 is introduced with a controlled fill level.

Another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the method, wherein during the filling of the individual container, the ingredients are introduced a plurality of times in alternation to improve the mixing of the ingredients in the individual container 2.

Yet another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the method, comprising the use of a filling system with at least one filling element 1, 1a, 1b with a discharge opening 15, 21.1, 26 which is controlled by means of a liquid path that has the single flow meter 9, 32 as well as a control or dosing valve unit 14, 33, and can optionally be placed in communication with chambers or bowls 4, 5, each of which holds one ingredient.

Still another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the method, wherein the beginning and/or the end of the filling of the individual container 2 are controlled by a liquid valve 16, 16a, 16b which is located in a part of the liquid path of the filling element or filling system which is common to all or substantially all or most of the ingredients.

A further feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the method, comprising the use of a flow meter 9, 32 which is realized in the form of a magnetic induction flow meter MID.

Another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in a method for the filling of bottles or similar containers 2 with a liquid which comprises at least two ingredients using a filling system with at least one filling element 1c, whereby the ingredients are mixed with one another before the filling of the container 2 in a mixing chamber 36 of the filling element 1c and the container 2 is filled with the liquid after the mixing, wherein the filling of the individual container 2 with the liquid from the mixing chamber 36 is controlled on the basis of the fill level.

Yet another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the method, wherein the filling of the individual container 2 with the liquid from the mixing chamber 36 takes place with the use of means to determine the fill level that extends into the interior of the container 2.

Still another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the method, wherein the means that determine the fill level are formed by at least one probe that has at least one probe contact or by a return gas tube or a notch in said tube.

A further feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the method, wherein the volume of the mixing chamber 36 is equal to at least the empty volume of a container 2.

One feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the method, wherein the volume of the mixing chamber 36 is equal to or slightly greater than the empty volume of a container 2.

Another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the method, wherein the containers 2 are filled using the open jet filling method.

Yet another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the method, wherein the containers 2 are filled using a filling system or filling element 1b with a filling tube 21.

Still another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the method, wherein the containers 2 are filled using a single-chamber or multiple-chamber filling system under counterpressure.

A further feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in a filling system for the filling of bottles or similar containers 2 with a liquid that comprises at least two ingredients, whereby the ingredients are mixed with one another during the filling of the respective container 2, with at least one filling element 11a, 1b with a discharge opening 15, 21.1, 26, for the dispensing of the liquid being bottled 1, 1a, 1b in the individual container 2, whereby the discharge opening 15, 21.1, 26 can be placed in communication via a liquid path 7, 10 and a dosing valve arrangement 14, 33 with bowls or chambers 4, 5, each of which houses one ingredient corresponding to the mixing ratio of the ingredients in the container 2, wherein a common flow meter 9, 32 is provided in the liquid path 7, 10 for all or substantially all or most of the ingredients.

Another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the filling system, wherein at least one dosing valve arrangement 14, 33 can be controlled so that during the filling of a container 2, the ingredients flow into the individual container 2 sequentially one after the other via the liquid path 7, 10 and the discharge opening 15, 21.1, 26.
Yet another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the filling system, comprising means for a termination of the filling based on the quantity or volume in the bottle, as a function of a measurement signal from the common flow meter 9, 32.

Still another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the filling system, comprising means 20, 24, 27 for a termination of the filling controlled as a function of the fill level.

A further feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the filling system, wherein the means for the termination of the filling as a function of the fill level are formed by at least one probe or by at least one probe contact 24.

Another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the filling system, wherein the means for the termination of the filling as a function of the fill level are formed by a return gas tube or by a notch in the return gas tube.

Yet another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the filling system, wherein the liquid path is formed at least partly by a liquid duct 7 with a liquid valve 16, 16a, 16b.

Still another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the filling system, wherein the dosing valve arrangement 14 has at least one controllable dosing valve 12, 13 for each ingredient.

A further feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the filling system, wherein the dosing valve arrangement is formed by a switching valve which is common to all or substantially all or most of the ingredients, for example by a 3/2 way valve 33 with a single valve body.

One feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the filling system, wherein the at least one dosing valve 33 of the dosing valve arrangement is integrated into the flow meter 32.

Another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in a filling system for the filling of bottles or similar containers 2 with a liquid that comprises at least two ingredients with at least one filling element 1c, whereby the ingredients are mixed with one another before the filling of the containers 2 in a mixing chamber 36 of the filling element 1c and the container 2 is filled with the liquid being bottled after the mixing, comprising means with which the filling of the individual container 2 with the liquid from the mixing chamber 36 is controlled as a function of the fill level.

Yet another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the filling system, comprising means that determine the fill level and extend into the interior of the individual container 2.

Still another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the filling system, wherein the means that determine the fill level are formed by at least one probe that has at least one probe contact or by a return gas tube or a notch in said tube.

A further feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the filling system, wherein the volume of the mixing chamber 36 is at least equal to the empty volume of a container 2.

Another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the filling system, wherein the volume of the mixing chamber 36 is equal to or slightly greater than the empty volume of a container 2.

Yet another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the filling system, wherein it is a component of a filling machine that employs a rotary construction with a plurality of filling systems or filling elements 1, 1a, 16 on a rotor 3 which can be driven in rotation around a vertical machine axis.

The components disclosed in the various publications, disclosed or incorporated by reference herein, may possibly be used in possible embodiments of the present invention, as well as equivalents thereof.

The purpose of the statements about the technical field is generally to enable the Patent and Trademark Office and the public to determine quickly, from a cursory inspection, the nature of this patent application. The description of the technical field is believed, at the time of the filing of this patent application, to adequately describe the technical field of this patent application. However, the description of the technical field may not be completely applicable to the claims as originally filed in this patent application, as amended during prosecution of this patent application, and as ultimately allowed in any patent issuing from this patent application. Therefore, any statements made relating to the technical field are not intended to limit the claims in any manner and should not be interpreted as limiting the claims in any manner.

The appended drawings in their entirety, including all dimensions, proportions and/or shapes in at least one embodiment of the invention, are accurate and are hereby included by reference into this specification.

The background information is believed, at the time of the filing of this patent application, to adequately provide background information for this patent application. However, the background information may not be completely applicable to the claims as originally filed in this patent application, as amended during prosecution of this patent application, and as ultimately allowed in any patent issuing from this patent application. Therefore, any statements made relating to the background information are not intended to limit the claims in any manner and should not be interpreted as limiting the claims in any manner.

All, or substantially all, of the components and methods of the various embodiments may be used with at least one embodiment or all of the embodiments, if more than one embodiment is described herein.

The purpose of the statements about the object or objects is generally to enable the Patent and Trademark Office and the public to determine quickly, from a cursory inspection, the nature of this patent application. The description of the object or objects is believed, at the time of the filing of this patent application, to adequately describe the object or
objects of this patent application. However, the description of
the object or objects may not be completely applicable to the
claims as originally filed in this patent application, as
amended during prosecution of this patent application, and as
ultimately allowed in any patent issuing from this patent
application. Therefore, any statements made relating to the
object or objects are not intended to limit the claims in any
manner and should not be interpreted as limiting the claims in any
manner.

[0102] All of the patents, patent applications and publica-
tions recited herein, and in the Declaration attached hereto,
are hereby incorporated by reference as if set forth in their
entirety herein.

[0103] The summary is believed, at the time of the filing
of this patent application, to adequately summarize this patent
application. However, portions or all of the information con-
tained in the summary may not be completely applicable to
the claims as originally filed in this patent application, as
amended during prosecution of this patent application, and as
ultimately allowed in any patent issuing from this patent
application. Therefore, any statements made relating to the
summary are not intended to limit the claims in any manner
and should not be interpreted as limiting the claims in any
manner.

[0104] It will be understood that the examples of patents,
published patent applications, and other documents which are
included in this application and which are referred to in para-
graphs which state “Some examples of . . . which may possi-
bly be used in at least one possible embodiment of the present
application . . .” may possibly not be used or useable in any
one or more embodiments of the application.

[0105] The sentence immediately above relates to patents,
published patent applications and other documents either
incorporated by reference or not incorporated by reference.

[0106] U.S. patent application Ser. No. 11/072,634, filed on
Mar. 4, 2005, having inventor Ludwig CLÜSSERATH, Attor-
ney Docket No. NHL-HOL-104, and title “BEVERAGE
BOTTLING PLANT FOR FILLING BOTTLES WITH A
LIQUID BEVERAGE MATERIAL HAVING A FILLING
ELEMENT AND A FILLING MACHINE HAVING SUCH
FILLING ELEMENTS,” and its corresponding Federal
101, filed on Mar. 6, 2004, are hereby incorporated by refer-
ence as if set forth in their entirety herein.

[0107] Some examples of liquid level sensing apparatuses
which may possibly be utilized or adapted for use in at least
one possible embodiment may possibly be found in the fol-
lowing U.S. Pat. No. 5,885,851, entitled “APPARATUS FOR
TRANSMITTING LIQUID HAVING LIQUID LEVEL
SENSING FUNCTION” No. 5,627,522, entitled “AUTO-
MATED LIQUID LEVEL SENSING SYSTEM,” U.S. Pat.
No. 4,912,976, entitled “LIQUID LEVEL SENSING APPA-
RATUS,” U.S. Pat. No. 4,739,658, entitled, “LEVEL SEN-
SING SYSTEM,” U.S. Pat. No. 4,685,332, entitled “LIQUID
LEVEL SENSING DEVICE,” and U.S. Pat. No. 4,356,480,
entitled “LIQUID LEVEL SENSING CIRCUITRY.”

[0108] The following patents, patent applications or patent
publications, are hereby incorporated by reference as if set
forth in their entirety herein: DE 43 24 799 A1, having the
following English translation of the German title “DEVICE
FOR POURING LIQUID INTO BOTTLES, CANS OR SIMILAR CONTAINERS,” published on Jan. 26, 1995. All of
the patents, patent applications or patent publications, which
were cited in the International Search Report dated Dec. 13,
2007, and/or cited elsewhere are hereby incorporated by ref-
erence as if set forth in their entirety herein as follows: DE 200
04 954, having the following German title “SENSORISCHER ABFÜLLAUTOMAT,” published on Feb. 28,
2002; WO 94/24037, having the title “rotating device for
filling bottles, cans or similar containers with portions of
liquid,” published on Oct. 27, 1994; EP 1 362 825, having
the title “device for supplying additives in filling machines
and associated filling machines,” published on Nov. 19, 2003;
and EP 0 775 668, having the following English translation of
the German title “FILLING MACHINE AND FILLING HEAD

[0109] The patents, patent applications, and patent
publications listed above in the preceding four paragraphs,
beg-
inning with the phrase: “U.S. patent application Ser. No.
11/072,634. . .,” and ending with the phrase: “. . . published
on May 28, 1997” are herein incorporated by reference as if
set forth in their entirety. The purpose of incorporating U.S.
patents, Foreign patents, publications, etc. is solely to pro-
vide additional information relating to technical features of one
or more embodiments, which information may not be com-
pletely disclosed in the wording in the pages of this applica-
tion. Words relating to the opinions and judgments of the
author and not directly relating to the technical details of
the description of the embodiments therein are not incorporated
by reference. The words all, always, absolutely, consistently,
preferably, guarantee, particularly, constantly, ensure, neces-
sarily, immediately, endlessly, avoid, exactly, continually,
expeditiously, need, must, only, perpetual, precise, perfect,
require, requisite, simultaneous, total, unavoidable, and
unnecessary, or words substantially equivalent to the abo-
mentioned words in this sentence, when not used to describe
technical features of one or more embodiments, are not con-
 sidered to be incorporated by reference herein.

[0110] The corresponding foreign and international patent
publication applications, namely, Federal Republic of Ger-
27, 2006, having inventors Ludwig CLÜSSERATH and Man-
fred MICHL, and DE-OS 10 2006 045 987.3 and DE-PS 10
2006 045 987.3, and International Application No. PCT/
EP2007/007818, filed on Sep. 7, 2007, having WIP0 Publica-
tion No. WO 2008/037338 and inventors Ludwig CLÜSSERATH and Manfred MICHL, are hereby incorpo-
rated by reference as if set forth in their entirety herein for
the purpose of correcting and explaining any possible misinter-
pretations of the English translation thereof. In addition, the
published equivalents of the above corresponding foreign and
international patent publication applications, and other
 equivalents or corresponding applications, if any, in cor-
responding cases in the Federal Republic of Germany and elsewhere, and the references and documents cited in any of
the documents cited herein, such as the patents, patent applica-
tions and publications, are hereby incorporated by reference
as if set forth in their entirety herein.

[0111] The purpose of incorporating the Foreign equivalent
patent application PCT/EP2007/007818 and German Patent
Application 10 2006 045 987.3 is solely for the purpose of
providing a basis of correction of any wording in the pages of
the present application, which may have been mistranslated or misinterpreted by the translator. Words relating to opinions
and judgments of the author and not directly relating to the
technical details of the description of the embodiments therein
are not to be incorporated by reference. The words all, always,
absolutely, consistently, preferably, guarantee, par-
ticularly, constantly, ensure, necessarily, immediately, end-
lessly, avoid, exactly, continually, expeditiously, need, must,
only, perpetual, precise, perfect, require, requisite, simulta-
neous, total, unavoidable, and unnecessary, or words sub-
stantially equivalent to the above-mentioned word in this sen-
tence, when not used to describe technical features of one or
more embodiments, are not generally considered to be incor-
porated by reference herein.

[0112] Statements made in the original foreign patent
applications PCT/EP2007/007818 and DE 10 2006 045 987.3
from which this patent application claims priority which do
not have to do with the correction of the translation in this
patent application are not to be included in this patent ap-
clication in the incorporation by reference.

[0113] All of the references and documents, cited in any of
the documents cited herein, are hereby incorporated by ref-
erence as if set forth in their entirety herein. All of the docu-
ments cited herein, referred to in the immediately preceding
sentence, include all of the patents, patent applications and
publications cited anywhere in the present application.

[0114] The description of the embodiment or embodiments
is believed, at the time of the filing of this patent applica-
tion, to adequately describe the embodiment or embodiments
of this patent application. However, portions of the description
of the embodiment or embodiments may not be completely
applicable to the claims as originally filed in this patent ap-
clication, as amended during prosecution of this patent applica-
tion, and as ultimately allowed in any patent issuing from this
patent application. Therefore, any statements made relating
to the embodiment or embodiments are not intended to limit
the claims in any manner and should not be interpreted as
limiting the claims in any manner.

[0115] The details in the patents, patent applications and
publications may be considered to be incorporeable, at appli-
cant’s option, into the claims during prosecution as further
limitations in the claims to patentably distinguish any ame-
ded claims from any applied prior art.

[0116] The purpose of the title of this patent application is
generally to enable the Patent and Trademark Office and the
public to determine quickly, from a cursory inspection, the
nature of this patent application. The title is believed, at the
time of the filing of this patent application, to adequately
reflect the general nature of this patent application. Howev-
er, the title may not be completely applicable to the technical
field, the object or objects, the summary, the description of
the embodiment or embodiments, and the claims as originally
filed in this patent application, as amended during prosecu-
tion of this patent application, and as ultimately allowed in
any patent issuing from this patent application. Therefore, the
title is not intended to limit the claims in any manner and
should not be interpreted as limiting the claims in any manner.

[0117] The abstract of the disclosure is submitted herewith
as required by 37 C.F.R. §1.72(b). As stated in 37 C.F.R.
§1.72(b):

[0118] A brief abstract of the technical disclosure in the
specification must commence on a separate sheet, pref-
errably following the claims, under the heading “Abstract
of the Disclosure.” The purpose of the abstract is to
enable the Patent and Trademark Office and the public
generally to determine quickly from a cursory inspection
the nature and gist of the technical disclosure. The abstract
shall not be used for interpreting the scope of the claims.

Therefore, any statements made relating to the abstract are
not intended to limit the claims in any manner and should not
be interpreted as limiting the claims in any manner.

[0119] The embodiements of the invention described herein
above in the context of the preferred embodiments are not to
be taken as limiting the embodiments of the invention to all of
the provided details thereof, since modifications and varia-
tions thereof may be made without departing from the spirit
and scope of the embodiements of the invention.

AT LEAST PARTIAL NOMENCLATURE

[0120] 1. 1a, 1b, 1c Filling element
[0121] 2 Bottle or container
[0122] 2.1 Bottle mouth
[0123] 2.2 Bottle flange
[0124] 3 Rotor
[0125] 4.5 Bowl
[0126] 4.1, 5.1 Gas chamber
[0127] 6. 6a, 6b Filling element housing
[0128] 7 Liquid duct
[0129] 8 Inlet
[0130] 9 Flow meter, MID flow meter
[0131] 10 Interface
[0132] 11 Control device
[0133] 12, 13 Dosing valve
[0134] 14 Valve or dosing unit
[0135] 15 Discharge opening
[0136] 16, 16a, 16b, 16c Liquid valve
[0137] 16.1 Valve body
[0138] 18 Actuator device for valve body 16.1
[0139] 19 Container carrier
[0140] 20 Probe
[0141] 21 Filler tube
[0142] 21.1 Discharge opening
[0143] 22 Container carrier
[0144] 23 Seal
[0145] 24 Probe contact
[0146] 25 Return gas tube
[0147] 26 Discharge opening
[0148] 27 Seal
[0149] 28 Container carrier
[0150] 29 Return gas path control valve arrangement
[0151] 30, 31 Return gas duct
[0152] 32 Flow meter
[0153] 33 3/2 way valve or dosing valve
[0154] 34, 35 Valve input
[0155] 36 Mixing chamber
[0156] 37 Sensor in the mixing chamber 36
[0157] 38 Inlet of the mixing chamber 36
[0158] 39 Probe

1-63. (canceled)

64. A method of filling beverage bottles, in a beverage
bottling plant, with a beverage material comprising a carbon-
atated water component and a liquid flavoring component while
compensating for variations in the volumes of beverage
bottles in a run of beverage bottles because of volume toler-
ances in the beverage bottles and adjusting the fill level in a
run of beverage bottles, with a similar or essentially identical
geometry, to make the beverage bottles appear to have a
substantially visually identical fill level appearing to a con-
sumer; said method comprising the steps of:

- disposing a beverage bottle under a filling element of a
  rotary beverage bottle filling machine;
discharging a predetermined volume of said carbonated water component into said beverage bottle and measuring said discharging of said carbonated water component with a flow meter;

stopping the flow of said carbonated water component upon said predetermined volume of said carbonated water component being discharged into said beverage bottle;

discharging a predetermined volume of said liquid flavoring component into said beverage bottle and measuring said discharging of said liquid flavoring component with said flow meter;

stopping the flow of said liquid flavoring component upon said predetermined volume of said liquid flavoring component being discharged into said beverage bottle; and

filling all beverage bottles in a run of beverage bottles, with a similar or essentially identical geometry, to a substantially identical fill level, to provide essentially identical appearing filled beverage bottles to a consumer by stopping the flow of a carbonated water component or a liquid flavoring component being upon a level sensor, which level sensor is disposed in a beverage bottle, detecting a predetermined level of a beverage material in the beverage bottle, while compensating for variations in the volumes of beverage bottles in a run of beverage bottles because of volume tolerances in the beverage bottles and adjusting the fill level in a run of beverage bottles, with a similar or essentially identical geometry, to make the beverage bottles appear to have a substantially visually identical fill level appearing to a consumer.

66. A beverage bottle filling arrangement for performing the method of filling beverage bottles, in a beverage bottling plant, with a beverage material comprising a carbonated water component and a liquid flavoring component while compensating for variations in the volumes of beverage bottles in a run of beverage bottles because of volume tolerances in the beverage bottles and adjusting the fill level in a run of beverage bottles, with a similar or essentially identical geometry, to make the beverage bottles appear to have a substantially visually identical fill level appearing to a consumer according to claim 64; said beverage bottle filling arrangement comprising:

a disposing arrangement being configured to dispose a beverage bottle under a filling element of a rotary beverage bottle filling machine;

a first discharging arrangement being configured to discharge a predetermined volume of a carbonated water component into a beverage bottle and to measure the discharging of the carbonated water component with a flow meter;

a first stopping arrangement being configured to stop the flow of a carbonated water component upon a predetermined volume of the carbonated water component being discharged into a beverage bottle;

a second discharging arrangement being configured to discharge a predetermined volume of a liquid flavoring component into a beverage bottle and to measure the discharging of the liquid flavoring component with said flow meter;

a second stopping arrangement being configured to stop the flow of a liquid flavoring component upon a predetermined volume of the liquid flavoring component being discharged into a beverage bottle; and

a filling arrangement being configured to fill all beverage bottles in a run of beverage bottles, with a similar or essentially identical geometry, to a substantially identical fill level, to provide essentially identical appearing filled beverage bottles to a consumer by stopping the flow of a carbonated water component or a liquid flavoring component being upon a level sensor, which level sensor is disposed in a beverage bottle, detecting a predetermined level of a beverage material in the beverage bottle, while compensating for variations in the volumes of beverage bottles in a run of beverage bottles because of volume tolerances in the beverage bottles and adjusting the fill level in a run of beverage bottles, with a similar or essentially identical geometry, to make the beverage bottles appear to have a substantially visually identical fill level appearing to a consumer.
67. The method of filling containers, in a container filling plant, with a material comprising a carbonated water component and a liquid flavoring component according to claim 64, wherein:

said method further comprises one of (A) and (B):
(A) discharging said predetermined volume of said carbonated water component into said container; and
discharging said predetermined volume of said liquid flavoring component into said container; and
(B) discharging said predetermined quantity or volume of said carbonated water component into a mixing chamber;
discharging said predetermined volume of said liquid flavoring component into said mixing chamber; and
discharging said predetermined quantity or volume of said carbonated water component and said predetermined volume of said liquid flavoring component from said mixing chamber to said container disposed under said filling element;
said step of discharging a predetermined quantity or volume of said carbonated water component further comprises discharging said predetermined quantity or volume of said carbonated water component and measuring said discharging of said carbonated water component with a flow meter;
said step of discharging a predetermined volume of said liquid flavoring component further comprises discharging said predetermined volume of said liquid flavoring component and measuring said discharging of said liquid flavoring component with said flow meter to maintain a substantially predetermined mixing ratio of said liquid flavoring component to said carbonated water component;
said method further comprises:
discharging at least a portion of a predetermined volume of said carbonated water component and measuring said discharging of said at least a portion of said carbonated water component with a flow meter;
-stopping the flow of said at least a portion of said carbonated water component upon said at least a portion of said predetermined volume of said carbonated water component being discharged;
discharging a portion of at least a predetermined volume of said liquid flavoring component and measuring said discharging of said at least a portion of said liquid flavoring component with said flow meter to maintain a predetermined mixing ratio of said liquid flavoring component to said carbonated water component;
-stopping the flow of said at least a portion of said liquid flavoring component upon said at least a portion of said predetermined volume of said liquid flavoring component being discharged;
discharging at least a non-zero portion of the remainder of said predetermined volume of said carbonated water component, if any, and measuring said discharging of said at least a non-zero portion of the remainder of said predetermined volume of said carbonated water component, if any, with said flow meter, upon discharging a portion of said predetermined volume of said liquid flavoring component;
discharging said carbonated water component from a first reservoir, through a conduit, and out of a discharge opening; and
discharging said liquid flavoring component from a second reservoir, through said conduit, and out of said discharge opening; and
said step of discharging said predetermined volume of said liquid flavoring component and measuring said discharging of said liquid flavoring component with said flow meter to maintain a substantially predetermined mixing ratio of said liquid flavoring component to said carbonated water component further comprises discharging said predetermined volume or a predetermined quantity of said liquid flavoring component and measuring said discharging of said liquid flavoring component with said flow meter to maintain a substantially predetermined mixing ratio of said liquid flavoring component to said carbonated water component.

68. The method of filling containers, in a container filling plant, with a material comprising a carbonated water component and a liquid flavoring component according to claim 67, wherein:

the beginning and/or the end of the filling of the individual container are controlled by a liquid valve which is located in a part of the liquid path of the filling element or filling system which is common to all of the ingredients;
the use of a flow meter which is realized in the form of a magnetic induction flow meter;
the filling of the individual container with the liquid from the mixing chamber takes place with the use of means to determine the fill level that extends into the interior of the container;
the means that determine the fill level are formed by at least one probe that has at least one probe contact or by a return gas tube or a notch in said tube;
one of (C) and (D):
(C) the volume of the mixing chamber is equal to at least the empty volume of a container; and
(D) the volume of the mixing chamber is equal to or only slightly greater than the empty volume of a container;
one of (E) and (F):
(E) the containers are filled using the open jet filling method; and
(F) the containers are filled using a filling system or filling element with a filling tube; and
the containers are filled using a single-chamber or multiple-chamber filling system under counterpressure.

69. A method of filling containers, in a container filling plant, with a material comprising a first ingredient and a second ingredient, while compensating for variations in the volumes of containers in a run of containers because of volume tolerances in the containers and adjusting the fill level in a run of containers, with a similar or essentially identical geometry, to make the containers appear to have a substantially visually identical fill level appearing to a consumer, said method comprising the steps of:
(A) disposing a container under a filling element of a container filling machine;
(B) discharging at least a portion of a predetermined volume of said first ingredient and measuring said discharging of said at least a portion of said first ingredient with a flow meter;

(C) stopping the flow of said at least a portion of said first ingredient upon said at least a portion of said predetermined volume of said first ingredient being discharged;

(D) discharging a portion of at least a predetermined volume of said second ingredient and measuring said discharging of said at least a said portion of said second ingredient with said flow meter to maintain a predetermined mixing ratio of said second ingredient to said first ingredient;

(E) stopping the flow of said at least a portion of said second ingredient upon said at least a portion of said predetermined volume of said second ingredient being discharged;

(F) discharging at least a non-zero portion of the remainder of said predetermined volume of said first ingredient, if any, and measuring said discharging of said at least a non-zero portion of the remainder of said predetermined volume of said first ingredient, if any, with said flow meter, upon discharging a portion of said predetermined volume of said first ingredient; and

(G) discharging at least a non-zero portion of the remainder of said predetermined volume of said second ingredient, if any, and measuring said discharging of said at least a non-zero portion of the remainder of said predetermined volume of said second ingredient, if any, with said flow meter, upon discharging a portion of said predetermined volume of said second ingredient, while compensating for variations in the volumes of containers in a run of containers because of volume tolerances in the containers and adjusting the fill level in a run of containers, with a similar or essentially identical geometry, to make the containers appear to have a substantially visually identical fill level appearing to a consumer.

70. Means for performing the method of filling containers, in a container filling plant, with a material comprising a first ingredient and a second ingredient according to claim 69; said means comprising:

means for disposing a container under a filling element of a container filling machine;

means for discharging at least a portion of a predetermined volume of a first ingredient and measuring the discharging of the at least a portion of the first ingredient with a flow meter;

means for stopping the flow of at least a portion of a first ingredient upon the at least a portion of the predetermined volume of the first ingredient being discharged; means for discharging a portion of at least a predetermined volume of a second ingredient and measuring the discharging of the at least a portion of the second ingredient with said flow meter to maintain a predetermined mixing ratio of the second ingredient to the first ingredient;

means for stopping the flow of at least a portion of a second ingredient upon the at least a portion of the predetermined volume of the second ingredient being discharged;

means for discharging at least a non-zero portion of the remainder of a predetermined volume of a first ingredient, if any, and measuring the discharging of the at least a non-zero portion of the remainder of the predetermined volume of the first ingredient, if any, with said flow meter, upon discharging a portion of a predetermined volume of the first ingredient; and

means for discharging at least a non-zero portion of the remainder of a predetermined volume of a second ingredient, if any, and measuring the discharging of the at least a non-zero portion of the remainder of the predetermined volume of the second ingredient, if any, with said flow meter, upon discharging a portion of a predetermined volume of the second ingredient.

71. A container filling arrangement for performing the method of filling containers, in a container filling plant, with a material comprising a first ingredient and a second ingredient according to claim 69; said container filling arrangement comprising:

a disposing arrangement being configured to dispose a container under a filling element of a container filling machine;

a first discharging arrangement being configured to discharge at least a portion of a predetermined volume of a first ingredient and to measure the discharging of the at least a portion of the first ingredient with a flow meter;

a first stopping arrangement being configured to stop the flow of at least a portion of a first ingredient upon the at least a portion of the predetermined volume of the first ingredient being discharged;

a second discharging arrangement being configured to discharge a portion of at least a predetermined volume of a second ingredient and to measure the discharging of the at least a portion of the second ingredient with said flow meter to maintain a predetermined mixing ratio of the second ingredient to the first ingredient;

a second stopping arrangement being configured to stop the flow of at least a portion of a second ingredient upon the at least a portion of the predetermined volume of the second ingredient being discharged;

said first discharging arrangement is configured to discharge at least a non-zero portion of the remainder of a predetermined volume of a first ingredient, if any, and to measure the discharging of the at least a non-zero portion of the remainder of the predetermined volume of the first ingredient, if any, with said flow meter, upon discharging a portion of a predetermined volume of the first ingredient; and

said second discharging arrangement is configured to discharge at least a non-zero portion of the remainder of a predetermined volume of a second ingredient, if any, and to measure the discharging of the at least a non-zero portion of the remainder of the predetermined volume of the second ingredient, if any, with said flow meter, upon discharging a portion of a predetermined volume of the second ingredient.

72. The method of filling containers, in a container filling plant, with a material comprising a first ingredient and a second ingredient according to claim 69, wherein said method further comprises repeating steps F and G a plurality of times.

73. The method of filling containers, in a container filling plant, with a material comprising a first ingredient and a second ingredient according to claim 72, wherein said method further comprises filling all containers in a run of containers, with a similar or essentially identical geometry, to a constant fill level, to provide essentially identically appearing filled containers to a final consumer by stopping the flow.
of at least said second ingredient upon a level sensor detecting a predetermined level of said material in a container.

74. The method of filling containers, in a container filling plant, with a material comprising a first ingredient and a second ingredient according to claim 73, wherein:

said method further comprises one of (H) and (I):

(H) discharging said predetermined volume of said first ingredient into said container; and

discharging said predetermined volume of said second ingredient into said container; and

(I) discharging said predetermined quantity or volume of said first ingredient into a mixing chamber;

discharging said predetermined volume of said second ingredient into said mixing chamber; and

discharging said predetermined quantity or volume of said first ingredient and said predetermined volume of said second ingredient from said mixing chamber to said container disposed under said filling element;

said step of discharging a predetermined quantity or volume of said first ingredient further comprises discharging said predetermined volume of said first ingredient and measuring said discharging of said first ingredient with a flow meter;

said step of discharging a predetermined volume of said second ingredient further comprises discharging said predetermined volume of said second ingredient and measuring said discharging of said second ingredient with said flow meter to maintain a substantially predetermined mixing ratio of said second ingredient to said first ingredient;

said method further comprises:

discharging at least a portion of a predetermined volume of said first ingredient and measuring said discharging of said at least a portion of said first ingredient with a flow meter;

stopping the flow of said at least a portion of said first ingredient upon said at least a portion of said predetermined volume of said first ingredient being discharged;

discharging a portion of at least a predetermined volume of said second ingredient and measuring said discharging of said at least a portion of said second ingredient with said flow meter to maintain a predetermined mixing ratio of said second ingredient to said first ingredient;

stopping the flow of said at least a portion of said second ingredient upon said at least a portion of said predetermined volume of said second ingredient being discharged;

discharging at least a non-zero portion of the remainder of said predetermined volume of said first ingredient, if any, and measuring said discharging of said at least a non-zero portion of the remainder of said predetermined volume of said first ingredient, if any, with said flow meter, upon discharging a portion of said predetermined volume of said first ingredient;

discharging at least a non-zero portion of the remainder of said predetermined volume of said second ingredient, if any, and measuring said discharging of said at least a non-zero portion of the remainder of said predetermined volume, if any, with said flow meter, upon discharging a portion of said predetermined volume of said second ingredient;

discharging said first ingredient from a first reservoir, through a conduit, and out of a discharge opening; and

discharging said second ingredient from a second reservoir, through said conduit, and out of said discharge opening;

said step of discharging said predetermined volume of said second ingredient and measuring said discharging of said second ingredient with said flow meter to maintain a substantially predetermined mixing ratio of said second ingredient to said first ingredient further comprises discharging said predetermined volume or a predetermined quantity of said second ingredient and measuring said discharging of said second ingredient with said flow meter to maintain a substantially predetermined mixing ratio of said second ingredient to said first ingredient;

the beginning and/or the end of the filling of the individual container are controlled by a liquid valve which is located in a part of the liquid path of the filling element or filling system which is common to all of the ingredients;

the use of a flow meter which is realized in the form of a magnetic induction flow meter;

the filling of the individual container with the liquid from the mixing chamber takes place with the use of means to determine the fill level that extends into the interior of the container;

the means that determine the fill level are formed by at least one probe that has at least one probe contact or by a return gas tube or a notch in said tube;

one of (J) and (K):

(J) the volume of the mixing chamber is equal to at least the empty volume of a container; and

(K) the volume of the mixing chamber is equal to or only slightly greater than the empty volume of a container;

one of (L) and (M):

(L) the containers are filled using the open jet filling method; and

(M) the containers are filled using a filling system or filling element with a filling tube;

the containers are filled using a single-chamber or multiple-chamber filling system under counterpressure;

said first ingredient comprises a carbonated water component; and

said second ingredient comprises a liquid flavoring component.

75. A method of filling containers, in a container filling plant, with a material comprising a first ingredient and a second ingredient, while compensating for variations in the volumes of beverage bottles in a run of beverage bottles because of volume tolerances in the beverage bottles and adjusting the fill level in a run of beverage bottles, with a similar or essentially identical geometry, to make the beverage bottles appear to have a substantially visually identical fill level appearing to a consumer; said method comprising the steps of:

disposing a container under a filling element of a container filling machine;

discharging a predetermined quantity or volume of said first ingredient and measuring said discharging of said first ingredient;

stopping the flow of said first ingredient upon said predetermined quantity or volume of said first ingredient being discharged;
discharging a predetermined volume of said second ingredient and measuring said discharging of said second ingredient to maintain a substantially predetermined mixing ratio of said second ingredient to said first ingredient; and

filling all containers in a run of containers, with a similar or essentially identical geometry, to a substantially visually identical fill level, to provide essentially identically appearing filled containers to a final consumer by stopping the flow of at least said second ingredient upon a level sensor detecting a predetermined level of said material in a container, while compensating for variations in the volumes of beverage bottles in a run of beverage bottles because of volume tolerances in the beverage bottles and adjusting the fill level in a run of beverage bottles, with a similar or essentially identical geometry, to make the beverage bottles appear to have a substantially visually identical fill level appearing to a consumer.

76. Means for performing the method of filling containers, in a container filling plant, with a material comprising a first ingredient and a second ingredient, while compensating for variations in the volumes of beverage bottles in a run of beverage bottles because of volume tolerances in the beverage bottles and adjusting the fill level in a run of beverage bottles, with a similar or essentially identical geometry, to make the beverage bottles appear to have a substantially visually identical fill level appearing to a consumer according to claim 75; said means comprising:

means for disposing a container under a filling element of a container filling machine;

means for discharging a predetermined quantity or volume of a first ingredient and measuring the discharging of the first ingredient;

means for stopping the flow of a first ingredient upon a predetermined quantity or volume of the first ingredient being discharged;

means for discharging a predetermined volume of a second ingredient and measuring the discharging of the second ingredient to maintain a substantially predetermined mixing ratio of the second ingredient to the first ingredient; and

means for filling all containers in a run of containers, with a similar or essentially identical geometry, to a substantially visually identical fill level, to provide essentially identically appearing filled containers to a final consumer by stopping the flow of at least said second ingredient upon a level sensor detecting a predetermined level of a material in a container, while compensating for variations in the volumes of beverage bottles in a run of beverage bottles because of volume tolerances in the beverage bottles and adjusting the fill level in a run of beverage bottles, with a similar or essentially identical geometry, to make the beverage bottles appear to have a substantially visually identical fill level appearing to a consumer.

77. A container filling arrangement for performing the method of filling containers, in a container filling plant, with a material comprising a first ingredient and a second ingredient, while compensating for variations in the volumes of beverage bottles in a run of beverage bottles because of volume tolerances in the beverage bottles and adjusting the fill level in a run of beverage bottles, with a similar or essentially identical geometry, to make the beverage bottles appear to have a substantially visually identical fill level appearing to a consumer according to claim 76; said container filling arrangement comprising:

a disposing arrangement being configured to dispose a container under a filling element of a container filling machine;

a first discharging arrangement being configured to discharge a predetermined quantity or volume of a first ingredient and to measure the discharging of the first ingredient;

a first stopping arrangement being configured to stop the flow of a first ingredient upon a predetermined quantity or volume of the first ingredient being discharged;

a second discharging arrangement being configured to discharge a predetermined volume of a second ingredient and to measure the discharging of the second ingredient to maintain a substantially predetermined mixing ratio of the second ingredient to the first ingredient; and

a filling arrangement being configured to fill all containers in a run of containers, with a similar or essentially identical geometry, to a substantially visually identical fill level, to provide essentially identically appearing filled containers to a final consumer by stopping the flow of at least said second ingredient upon a level sensor detecting a predetermined level of a material in a container, while compensating for variations in the volumes of beverage bottles in a run of beverage bottles because of volume tolerances in the beverage bottles and adjusting the fill level in a run of beverage bottles, with a similar or essentially identical geometry, to make the beverage bottles appear to have a substantially visually identical fill level appearing to a consumer.

78. The method of filling containers, in a container filling plant, with a material comprising a first ingredient and a second ingredient according to claim 75, wherein said method further comprises one of (A) and (B):

(A) discharging said predetermined volume of said first ingredient into said container; and

discharging said predetermined volume of said second ingredient into said container; and

(B) discharging said predetermined quantity or volume of said first ingredient into a mixing chamber;

discharging said predetermined volume of said second ingredient into said mixing chamber; and

discharging said predetermined quantity or volume of said first ingredient and said predetermined volume of said second ingredient from said mixing chamber to said container disposed under said filling element.

79. The method of filling containers, in a container filling plant, with a material comprising a first ingredient and a second ingredient according to claim 78, wherein:

said step of discharging a predetermined quantity or volume of said first ingredient further comprises discharging said predetermined quantity or volume of said first ingredient and measuring said discharging of said first ingredient with a flow meter; and

said step of discharging a predetermined volume of said second ingredient further comprises discharging said predetermined volume of said second ingredient and measuring said discharging of said second ingredient with said flow meter to maintain a substantially predetermined mixing ratio of said second ingredient to said first ingredient.
80. The method of filling containers, in a container filling plant, with a material comprising a first ingredient and a second ingredient according to claim 79, wherein said method further comprises:

- discharging at least a portion of a predetermined volume of said first ingredient and measuring said discharging of said at least a portion of said first ingredient with a flow meter;
- stopping the flow of said at least a portion of said first ingredient upon said at least a portion of said predetermined volume of said first ingredient being discharged;
- discharging a portion of at least a predetermined volume of said second ingredient and measuring said discharging of said at least a portion of said second ingredient with said flow meter to maintain a predetermined mixing ratio of said second ingredient to said first ingredient;
- stopping the flow of said at least a portion of said second ingredient upon said at least a portion of said predetermined volume of said second ingredient being discharged;

- discharging at least a non-zero portion of the remainder of said predetermined volume of said first ingredient, if any, and measuring said discharging of said at least a non-zero portion of the remainder of said predetermined volume of said first ingredient, if any, with said flow meter, upon discharging a portion of said predetermined volume of said first ingredient; and
- discharging at least a non-zero portion of the remainder of said predetermined volume of said second ingredient, if any, and measuring said discharging of said at least a non-zero portion of the remainder of said predetermined volume, if any, with said flow meter, upon discharging a portion of said predetermined volume of said second ingredient;

said method further comprises:

- discharging said first ingredient from a first reservoir, through a conduit, and out of a discharge opening; and
- discharging said second ingredient from a second reservoir, through said conduit, and out of said discharge opening;

said step of discharging said predetermined volume of said second ingredient and measuring said discharging of said second ingredient with said flow meter to maintain a substantially predetermined mixing ratio of said second ingredient to said first ingredient further comprises discharging said predetermined volume or a predetermined quantity of said second ingredient and measuring said discharging of said second ingredient with said flow meter to maintain a substantially predetermined mixing ratio of said second ingredient to said first ingredient;

the beginning and/or the end of the filling of the individual container are controlled by a liquid valve which is located in a part of the liquid path of the filling element or filling system which is common to all of the ingredients;

the use of a flow meter which is realized in the form of a magnetic induction flow meter;

the filling of the individual container with the liquid from the mixing chamber takes place with the use of means to determine the fill level that extends into the interior of the container;

the means that determine the fill level are formed by at least one probe that has at least one probe contact or by a return gas tube or a notch in said tube;

one of (C) and (D):

(C) the volume of the mixing chamber is equal to at least the empty volume of a container; and

(D) the volume of the mixing chamber is equal to or only slightly greater than the empty volume of a container;

one of (E) and (F):

(E) the containers are filled using the open jet filling method; and

(F) the containers are filled using a filling system or filling element with a filling tube;

the containers are filled using a single-chamber or multiple-chamber filling system under counterpressure;

said first ingredient comprises a carbonated water component; and

said second ingredient comprises a liquid flavoring ingredient.

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