

Description

This invention relates to juice dispensing and in a preferred embodiment to dispensing orange juice from 5 + 1 concentrate (5 parts water to 1 part concentrate) at -10° F to 0° F.

Postmix orange juice dispensing systems are known for example from FR 2126102. Orange juice concentrate is distributed frozen. Restaurants remove concentrate from the freezer and thaw the concentrate in a cooler prior to dispensing. The restaurant has to estimate its juice requirements at least two days in advance and place sufficient concentrate in its cooler. If the restaurant's estimates are incorrect or if someone forgets, the restaurant will run out of thawed concentrate. Also, there is often a limited amount of cooler space available for thawing orange juice concentrate. When a restaurant runs out of thawed concentrate, measures are sometimes taken to quickly thaw frozen concentrate and such measures often are inefficient and ineffective and also sometimes affect the taste of the resulting product. Orange juice concentrate has typically been 3 + 1 concentrate. The present invention is useful with 5 + 1 concentrate. The reduced amount of water in 5 + 1 concentrate prevents a phase change or freezing, at typical freezer temperatures of -10° F (-23° C) to 0° F (-18° C). The 5 + 1 concentrate at freezer temperatures does not readily flow by gravity. A container of 0° F (-18° C) product can be inverted and no product will flow out. Also, the product is so thick that a pump's suction cannot pull product from the container. However, the product is still pliable.

Viewed from one aspect the present invention provides apparatus for reconstituting and dispensing juice comprising:

- (a) a canister arranged to hold and dispense a quantity of juice concentrate;
- (b) a mixing chamber and a nozzle for dispensing a beverage therefrom;
- (c) a concentrate conduit extending from said canister to said mixing chamber;
- (d) a water conduit extending into said mixing chamber; and
- (e) metering means in said conduits for controlling the ratio of water to concentrate fed to said mixing chamber,

characterised in that said canister is pressurizable and is arranged to dispense pliable juice concentrate at a temperature below 32° F (0° C), means are provided for pressurizing said canister so that pressure in said canister forces concentrate into said concentrate conduit, and means for heating concentrate in said concentrate conduit are provided.

According to a second aspect of the invention,

there is provided a method of reconstituting and dispensing juice comprising:

- (a) forcing juice concentrate out of container into a concentrate conduit;
- (b) feeding the concentrate to a metering device;
- (c) feeding water to a metering device; and
- (d) feeding a controlled ratio of water to concentrate to a mixing chamber.

characterised in that the juice is pliable and is forced at a temperature of below 32° F (0° C) out of the container which is in the form of a bag and by the step of heating the concentrate in said concentrate conduit to above 32° F (0° C).

In a preferred form the invention provides a postmix beverage dispensing system for dispensing 5 + 1 concentrate at freezer temperatures from a flexible bag including placing the bag in a rigid, pressurizable container, pressurizing the container to force concentrate out of the bag, feeding concentrate through a heat exchanger to raise the temperature to about 32° F (0° C) to 40° F (4° C), feeding the thawed concentrate to a metering device along with water for controlling the mixture ratio, and then feeding the water and concentrate to a mixing chamber of a dispensing valve for dispensing the mixture as an orange juice beverage into a cup. The concentrate bag preferably incorporates a dip tube or dip strip with slots larger than the pulp in the concentrate and with an internal cross-sectional area much greater than that of the slots to facilitate flowing of the concentrate and to reduce pressure drops. The tube prevents the bag from blocking the internal passageway therethrough. Concentrate emerging from the bag can be as cold as -10° F (-23° C). The heat exchanger can use recirculating soda water and a heating element to prevent the water from freezing. The proper portioning of water and orange juice concentrate during reconstitution preferably incorporates a volumetric piston pump operated by the pressurized water. Alternatively, the water and orange juice concentrate can be metered by use of a flow meter to measure the water flow rate and a volumetric pump with motor drive at a fixed speed to meter the concentrate. Control electronics, such as a microcontroller, can regulate the water flow rate by use of a motorized control valve. The concentrate pump's motor can be adjustable and the control electronics can then also or alternatively regulate the speed of the pump motor depending on the water flow rate. The actual reconstituting of the metered water and concentrate can incorporate either a static or a dynamic mixer.

Some embodiments of the invention will now be described by way of example and with reference to the accompanying drawings, in which:

FIG. 1 is a partly diagrammatic, partly schematic

illustration of a postmix juice dispensing system according to the present invention;

FIG. 2 is a partly diagrammatic, partly schematic illustration of another embodiment of a postmix juice dispensing system according to the invention;

FIG. 3 is a partly cross-sectional, partly diagrammatic, partly schematic illustration of a metering system for use in a system of the present invention;

FIG. 4 is a perspective view of an orange juice concentrate container for use in shipping and storing orange juice concentrate at freezer temperatures;

FIG. 5 is a partial, cross-sectional view through a concentrate bag, spout and dip tube;

FIG. 6 is a partial, cross-sectional view through the top of a pressurizable canister or vessel for holding the flexible concentrate bag; and

FIG. 7 is a partly diagrammatic, partly schematic illustration of another embodiment of a postmix juice dispensing system according to the present invention.

With reference now to the drawings, FIG. 1 shows a postmix juice dispensing system 10 for dispensing a finished juice beverage from a nozzle 12 of a mixing chamber 16 into a cup 14. The system 10 feeds water and juice concentrate, in a desired ratio, for example, 5 parts of water to 1 part of concentrate, into the mixing chamber 16 wherein complete mixing of the concentrate and water takes place.

The water is fed through a water conduit 18 to a metering device 20 and then to the mixing chamber 16.

The concentrate is contained in a concentrate bag 30 at freezer temperatures of about -10°F (-23°C) to about 0°F (-18°C). The bag 30 is preferably a nonreturnable, flexible bag. The bag 30 is removed from a freezer and placed in a rigid, pressurizable canister 32 which is then pressurized by a pressure source (such as a CO_2 or compressed air cylinder 34) and a pressure regulator 36. The pressure forces the concentrate, which is not frozen (it has not undergone a phase change) because of its low water content but which is pliable, through a concentrate conduit 38 to a heat exchanger 40, then to the metering device 20, and then to the mixing chamber 16.

This design allows dispensing of a 5 + 1 concentrate at freezer temperatures. The pliable concentrate contained in the flexible bag 30 is preferably shipped in a cylindrical container 41 (see FIG. 4) to facilitate insertion of the bag 30 into the cylindrical canister 32. The restaurant simply inserts the frozen bag 30 directly from the freezer into the canister 32, without requiring any thawing.

FIG. 5 is a partial view of the bag 30 showing a

dip tube or strip 42 connected to a spout 43. The dip strip 42 includes a central passageway 44 and a plurality of openings 46 into the passageway 44. The openings 46 are of a size sufficiently large to allow pulp to pass into the passageway 44 while preventing the bag from entering into and blocking the passageway 44. The larger cross-sectional area of the passageway 44 facilitates flowing of the concentrate and reduces pressure drops due to friction.

The canister 32 is shown in more detail in FIG. 6 and includes a removable lid 48 that hermetically seals to the wall 49 of the canister. The lid 48 includes a fitting 50 for pressurizing the canister 32 (with CO_2 or air, for example) and a concentrate fitting 52 for connecting the spout 43 of the bag 30 to the concentrate conduit 38.

As stated above, the concentrate in the bag 30 is preferably 5 + 1 concentrate. The canister is preferably pressurized to about 40 psig. This pressure forces the concentrate out of the bag to the heat exchanger 40 and then to the metering device 20 and finally to the mixing chamber 16.

The heat exchanger 40 includes a heat source 60 and can be any known type of heat exchanger and heat source. The heat exchanger preferably elevates the temperature of the concentrate to about 32°F (0°C) to 40°F (4°C). The heat source 60 can be a thermostatically controlled electrical heating element.

The metering device 20 (which can be any known type of metering device) provides the proper portioning of the water and orange juice concentrate. The device 20 can use two connected double-acting pistons in a volumetric piston pump for each of the water and concentrate conduits. The ratio of the volume of the water chambers to the concentrate chambers is the same as the desired mixture ratio, such as, for example 5:1 (water to concentrate). The water pistons can be connected to the concentrate pistons so that the pressurized water can be used to operate both pumps.

The system of FIG. 1 also includes a solenoid on-off valve 19 in the water line, operated by a microcontroller 64. When it is desired to dispense a drink, for example when a cup 14 engages a lever 15, the microcontroller 64 causes the valve 19 to open, and when dispensing is completed, it closes the valve 19.

In addition, the microcontroller 64 also operates the inlet and outlet valves for the water and concentrate to and from the metering device 20, in response, for example, to sensed positions of the pistons. Volumetric piston pumps are well-known and thus need not be described in detail here.

FIG. 2 shows a preferred embodiment of the system of FIG. 1 in which a recirculating water conduit 59 is in heat exchange relationship to the

concentrate conduit 38, in addition to the use of separate heat source 60. The water conduit 59 can be a recirculating soda water line available in the restaurant, for example. The heat source 60 prevents the water from freezing.

In addition, FIG. 2 shows a particular metering device 20 which can be used. FIG. 2 shows a water pump 65 with two connected pistons, connected in turn to two connected pistons of a concentrate pump 66. A water control valve 67 of the water pump is mechanically operated by a linkage 68 connected to a reciprocating shaft 69 connecting to the two water pistons. Inlet and outlet valves 70 of the concentrate pump 66 are preferably controlled by the microcontroller 64 in response to sensed positions of the concentrate pistons. In FIG. 1, the sensing of the positions of the pistons is shown at 62, and the control of the inlet and outlet valves at 61.

FIG. 3 shows an alternative means for metering the water and the orange juice concentrate. This means includes a flow meter 80 in the water conduit 18 for measuring the water flow rate; electrical pulses whose period is proportional to the water flow rate are inputted into a microcontroller 82. A volumetric pump 84 meters the concentrate through the concentrate conduit 38. The concentrate pump 84 incorporates two chambers 86 and 87 with connected pistons 88 and 89. Each piston stroke finds one piston expelling a fixed volume of concentrate while the attached chamber is filling with concentrate. A motor 90 moves the pistons 88 and 89. The motor speed can be fixed. The water flow rate is controlled by means of a variable size orifice in a motorized control valve 92 operated by a DC stepping motor 94. The microcontroller 82 controls the motor 94 to regulate the water flow rate.

Alternatively, the motor 90 can be adjustable with the microcontroller 82 regulating the speed of the motor 90 to control the concentrate flow rate depending on the water flow rate as measured by the flow meter 80, to control the mixture ratio. The microcontroller 82 can also control both the motor 90 and the control valve 92.

FIG. 7 shows another embodiment of the present invention of a dispensing system 100 in which the concentrate is fed to a vented reservoir 102. FIG. 7 shows a water conduit 104 connected to a mixing chamber 103 and having a water flow meter 105, a motorized control valve 106 operated by a D.C. stepping motor 108, and a solenoid controlled on-off valve 110.

FIG. 7 also shows a concentrate conduit 114 which feeds pliable concentrate from a flexible container 116 in a pressurized canister 118, through a heat exchanger 120 (including a heat source 99 and a recirculating soda water line 101), through a

solenoid controlled on-off valve 122, to the reservoir 102. The reservoir 102 includes high and low level indicators 126 and 128, respectively, connected to a microcontroller 130, which opens and closes the on-off valve 122 in response to signals from the level indicators. A concentrate conduit 132 extends from the reservoir 102 to a flexible vane pump 134 (or a gerotor pump, for example), and then to the mixing chamber 103 where it mixes with the water to form a final beverage which is dispensed from a nozzle 136 into a cup 138.

In addition to the microcontroller 130 controlling the level of concentrate in the reservoir 102, it also controls the speed of a D.C. motor 140 with encoder 142 to control the concentrate flow rate, and it controls the water flow rate by controlling the motorized water control valve 106 in response to signals from the water flow meter 105. The microcontroller 130 also controls the solenoid controlled, water on-off valve 110 in response to actuation of the dispensing system 100, such as by the cup 138 engaging a lever arm 152.

While preferred embodiments of this invention has been described in detail, it is to be understood that variations and modifications can be made therein without departing from the scope of the present invention as set forth in the appended claims. For example, this invention can be used with various juices other than the preferred orange juice. Also, the juice can be thawed juice, such as thawed 3+1 juice; that is, this invention is not limited to use with pliable 5+1 concentrate at freezer temperatures. Also, the preferred temperature ranges are only preferred, other freezer temperatures below 32° F (0° C) can be used, and the heat exchanger can raise the temperature to any desired temperature above 32° F (0° C). Also, the heat exchanger can include a water conduit, such as a recirculating soda water line that is available in the restaurant, in heat exchange relationship thereto.

It will thus be seen that the present invention, at least in its preferred forms, provides a postmix juice dispensing system for use with 5 + 1 concentrate at freezer temperatures; and furthermore provides a postmix juice dispensing system for use with 5 + 1 concentrate at freezer temperatures in which the concentrate is contained in a flexible bag which is then placed in a pressurizable vessel which is pressurized to about 40 psig to force concentrate out of the bag; and furthermore provides a postmix juice dispensing system for dispensing 5 + 1 concentrate at freezer temperatures including elevating the concentrate temperature to about 32° F (0° C) to 40° F (4° C), forcing the thawed concentrate to a metering device, and then feeding the thawed and metered concentrate to a mixing chamber of a dispensing valve; and further-

more provides a postmix juice dispensing system in which 5 + 1 concentrate at freezer temperatures is placed in a flexible bag in a pressurizable vessel and forced by pressure out of the flexible bag, fed through a heat exchanger, then fed through a metering device, and finally fed to a mixing chamber of a dispensing valve; and furthermore provides a juice dispensing system for any juice or syrup which has been cooled but which has not experienced a phase change from liquid to solid.

Claims

1. Apparatus (10) for reconstituting and dispensing juice, comprising:

- (a) a canister (32) arranged to hold and dispense a quantity of juice concentrate;
- (b) a mixing chamber (16) and a nozzle (12) for dispensing a beverage therefrom;
- (c) a concentrate conduit (38) extending from said canister (32) to said mixing chamber (16);
- (d) a water conduit (18) extending into said mixing chamber (16); and
- (e) metering means (20) in said conduits (18,38) for controlling the ratio of water to concentrate fed to said mixing chamber (16),

characterised in that said canister (32) is pressurizable and is arranged to dispense pliable juice concentrate at a temperature below 32° F (0° C), means are provided for pressurizing said canister (32) so that pressure in said canister (32) forces concentrate into said concentrate conduit (38) and means (40) for heating concentrate in said concentrate conduit (38) are provided.

2. Apparatus as claimed in claim 1 wherein said heating means (40) includes a recirculating water conduit (59) located in heat exchange relationship to said concentrate conduit (38).

3. Apparatus as claimed in claim 1 or 2 wherein said metering means (20) comprises a volumetric piston pump in at least one of said concentrate conduit (38) and said water conduit (18).

4. Apparatus as claimed in claim 3 including a volumetric piston pump in each of said conduits (18,38), and wherein the ratio of the pump volumes is the desired mixture ratio.

5. Apparatus as claimed in claim 1 or 2 wherein said metering means includes a microcontroller (82), a flow meter (80) in said water line, and a motorized control valve (92) in said

water line (18), said flow meter (80) and motorized control valve (92) being connected to said microcontroller (82).

6. Apparatus as claimed in claim 5 including a concentrate reservoir (102), means (130) for automatically maintaining said reservoir filled with concentrate, said concentrate conduit (132) feeding concentrate from said heating means to said reservoir (102), and means (134,144) for feeding a controlled volume of concentrate from said reservoir (102) to said mixing chamber (103) during dispensing.

7. Apparatus as claimed in claim 6 wherein said feeding means comprises a pump (134) and a D.C. motor (140) with an encoder (142) connected to said microcontroller (130).

8. Apparatus as claimed in claim 7 wherein said pump is a flexible vane pump (134).

9. Apparatus as claimed in claim 1 or 2 including a solenoid controlled on-off valve (122) in said water line.

10. Apparatus as claimed in any preceding claim wherein said pressurizable canister (32) includes a removable lid (48) and a bag (30) of pliable juice concentrate located in said canister (32).

11. Apparatus as claimed in claim 10 wherein said bag of concentrate (30) is at a temperature of from about -10° F (-23° C) to 0° F (-18° C).

12. Apparatus as claimed in any preceding claim wherein said pressuring means includes a pressurized CO₂ source (34) and a pressure regulator (36).

13. A method of reconstituting and dispensing juice comprising:

- (a) forcing juice concentrate out of container (30) into a concentrate conduit (38);
- (b) feeding the concentrate to a metering device (20);
- (c) feeding water to a metering device (20); and

- (d) feeding a controlled ratio of water to concentrate to a mixing chamber (16),

characterised in that the juice is pliable and is forced at a temperature of below 32° F (0° C) out of the container which is in the form of a bag and by the step of heating the concentrate in said concentrate conduit (38) to above 32° F (0° C).



more provides a postmix juice dispensing system in which 5 + 1 concentrate at freezer temperatures is placed in a flexible bag in a pressurizable vessel and forced by pressure out of the flexible bag, fed through a heat exchanger, then fed through a metering device, and finally fed to a mixing chamber of a dispensing valve; and furthermore provides a juice dispensing system for any juice or syrup which has been cooled but which has not experienced a phase change from liquid to solid.

Claims

1. Apparatus (10) for reconstituting and dispensing juice, comprising:

- (a) a canister (32) arranged to hold and dispense a quantity of juice concentrate;
- (b) a mixing chamber (16) and a nozzle (12) for dispensing a beverage therefrom;
- (c) a concentrate conduit (38) extending from said canister (32) to said mixing chamber (16);
- (d) a water conduit (18) extending into said mixing chamber (16); and
- (e) metering means (20) in said conduits (18,36) for controlling the ratio of water to concentrate fed to said mixing chamber (16).

characterised in that said canister (32) is pressurizable and is arranged to dispense pliable juice concentrate at a temperature below 32° F (0° C), means are provided for pressurizing said canister (32) so that pressure in said canister (32) forces concentrate into said concentrate conduit (38) and means (40) for heating concentrate in said concentrate conduit (38) are provided.

2. Apparatus as claimed in claim 1 wherein said heating means (40) includes a recirculating water conduit (59) located in heat exchange relationship to said concentrate conduit (38).

3. Apparatus as claimed in claim 1 or 2 wherein said metering means (20) comprises a volumetric piston pump in at least one of said concentrate conduit (38) and said water conduit (18).

4. Apparatus as claimed in claim 3 including a volumetric piston pump in each of said conduits (18,38), and wherein the ratio of the pump volumes is the desired mixture ratio.

5. Apparatus as claimed in claim 1 or 2 wherein said metering means includes a microcontroller (82), a flow meter (80) in said water line, and a motorized control valve (92) in said

water line (18), said flow meter (80) and motorized control valve (92) being connected to said microcontroller (82).

6. Apparatus as claimed in claim 5 including a concentrate reservoir (102), means (130) for automatically maintaining said reservoir filled with concentrate, said concentrate conduit (132) feeding concentrate from said heating means to said reservoir (102), and means (134,144) for feeding a controlled volume of concentrate from said reservoir (102) to said mixing chamber (103) during dispensing.

7. Apparatus as claimed in claim 6 wherein said feeding means comprises a pump (134) and a D.C. motor (140) with an encoder (142) connected to said microcontroller (130).

8. Apparatus as claimed in claim 7 wherein said pump is a flexible vane pump (134).

9. Apparatus as claimed in claim 1 or 2 including a solenoid controlled on-off valve (122) in said water line.

10. Apparatus as claimed in any preceding claim wherein said pressurizable canister (32) includes a removable lid (48) and a bag (30) of pliable juice concentrate located in said canister (32).

11. Apparatus as claimed in claim 10 wherein said bag of concentrate (30) is at a temperature of from about -10° F (-23° C) to 0° F (-18° C).

12. Apparatus as claimed in any preceding claim wherein said pressuring means includes a pressurized CO₂ source (34) and a pressure regulator (36).

13. A method of reconstituting and dispensing juice comprising:

- (a) forcing juice concentrate out of container (30) into a concentrate conduit (38);
- (b) feeding the concentrate to a metering device (20);
- (c) feeding water to a metering device (20); and

- (d) feeding a controlled ratio of water to concentrate to a mixing chamber (16),

characterised in that the juice is pliable and is forced at a temperature of below 32° F (0° C) out of the container which is in the form of a bag and by the step of heating the concentrate in said concentrate conduit (38) to above 32° F (0° C).



14. A method as claimed in claim 13 wherein said juice is 5 + 1 orange juice and said forcing step comprises placing a flexible bag (30) of said concentrate at a temperature of from about -10° F (-23° C) to 0° F (-18° C) in a pressurizable canister (32) and pressurising said canister (32) with CO₂ at about 40 psig.

Revendications

1. Appareil (10) destiné à reconstituer et à distribuer un jus comprenant:

- (a) une boîte métallique (32) agencée pour contenir et distribuer une quantité de concentré;
- (b) une chambre de mélange (16) et un ajutage (12) destiné à distribuer une boisson à partir de celle-ci;
- (c) un conduit de concentré (38) s'étendant depuis ladite boîte métallique (32) jusqu'à ladite chambre de mélange (16);
- (d) un conduit d'eau (18) s'étendant dans ladite chambre de mélange (16); et
- (e) des moyens de mesure (20) dans lesdits conduits (18, 36) pour régler le rapport entre l'eau et le concentré amenés dans ladite chambre de mélange (16);

caractérisé en ce que ladite boîte métallique (32) peut être mise sous pression et est agencée pour distribuer un concentré pliable de jus à une température inférieure à 0° C (32° F), des moyens sont disposés pour mettre sous pression ladite boîte métallique (32) de façon que la pression à l'intérieur de ladite boîte métallique (32) force le concentré dans ledit conduit (38) de concentré et des moyens (40) de chauffage de concentré sont disposés dans ledit conduit de concentré (38).

Appareil selon la revendication 1, dans lequel ledit moyen de chauffage (40) comprend un conduit (59) de remise en circulation d'eau situé dans une relation d'échange thermique avec ledit conduit (38) de concentré.

- 3. Appareil selon la revendication 1 ou 2, dans lequel ledit moyen de mesure (20) comprend une pompe volumétrique à piston dans au moins l'un parmi lesdits conduits: conduit (38) de concentré et conduit (18) d'eau.
- 4. Appareil selon la revendication 3 comprenant une pompe volumétrique à piston dans chacun desdits conduits (18, 38) et dans lequel le rapport entre le volume des pompes est le rapport de mélange souhaité.
- 5. Appareil selon la revendication 1 ou 2 dans

lequel ledit moyen de mesure comprend un microdispositif de commande (52), un débitmètre (80) dans ladite ligne d'eau, et une valve de réglage motorisée (92) dans ladite ligne d'eau (18), ledit débitmètre (80) et ladite valve de réglage motorisée (92) étant reliées audit microdispositif de réglage (82).

- 6. Appareil selon la revendication 5 comprenant un réservoir (102) de concentré, un moyen (130) pour maintenir automatiquement rempli de concentré ledit réservoir, ledit conduit (132) de concentré amenant le concentré depuis ledit moyen de chauffage vers ledit réservoir (102), et un moyen (134, 144) pour amener un volume réglé de concentré depuis ledit réservoir (102) vers ladite chambre de mélange (103) pendant la distribution.

- 7. Appareil selon la revendication 6 dans lequel ledit moyen d'amenée comprend une pompe (134) et un moteur en courant continu (140) pourvu d'un encodeur (142) relié audit microdispositif de réglage (130).

- 8. Appareil selon la revendication 7 dans lequel ladite pompe est une pompe (134) à pales flexibles.

- 9. Appareil selon la revendication 1 ou 2 comprenant une valve (122) de marche-arrêt commandée par électroaimant dans ladite ligne d'eau.

- 10. Appareil selon une revendication précédente quelconque dans lequel ladite boîte métallique (32) qui peut être mise sous pression comprend un couvercle amovible (48) et un sac (30) de concentré de jus pliable situé dans ladite boîte métallique (32).

- 11. Appareil selon la revendication 10 dans lequel ledit sac de concentré (30) est à une température comprise entre environ -23° C (-10° F) et -18° C (-0° F).

- 12. Appareil selon une revendication précédente quelconque dans lequel ledit moyen de mise sous pression comprend une source de CO₂ sous pression (34) et un régulateur de pression (36).

- 13. Un procédé de reconstitution et de distribution de jus comprenant les étapes consistant à:
 - (a) forcer le concentré de jus hors du récipient (30) vers un conduit de concentré e- (38);
 - (b) amener le concentré à un dispositif de mesure (20);



(c) amener de l'eau à un dispositif de mesure (20); et

(d) amener un rapport commandé d'eau et de concentré dans une chambre de mélange (16);

caractérisé en ce que le jus est pliable et est forcé à une température inférieure à 0°C (32°F) hors du récipient qui est en forme de sac et par étape de chauffage du concentré dans ledit conduit (38) de concentré à plus 0°C (32°F).

14. Un procédé selon la revendication 13 dans lequel ledit jus est un jus d'orange 5 + 1 et ladite étape d'envoi à force comprend une mise en place d'un sac flexible (30) dudit concentré à une température comprise entre environ -23°C (-10°F) et -18°C (0°F) dans une boîte métallique (32) qui peut être mise sous pression et la mise sous pression de ladite boîte (32) à l'aide de CO₂ à environ 2,812 K/cm² (40 psig).

Patentansprüche

1. Vorrichtung (10) zum Wiederaufbereiten und Ausgeben von Saft, welche aufweist:
 - (a) einen Kanister (32), welcher derart eingerichtet ist, daß er eine Menge eines Saftkonzentrats hält und ausgibt;
 - (b) eine Mischkammer (16) und eine Düse (12) zur Ausgabe eines Getränks hiervon;
 - (c) eine Konzentratleitung (38), die sich vom Kanister (32) zu der Mischkammer (16) erstreckt;
 - (d) eine Wasserleitung (18), welche in die Mischkammer (16) geht; und
 - (e) eine Dosiereinrichtung (20) in den Leitungen (18, 36) zum Steuern des Verhältnisses von Wasser zu Konzentrat, welche der Mischkammer (16) zugeleitet werden, dadurch gekennzeichnet, daß der Kanister (32) druckbeaufschlagbar ist und derart ausgelegt ist, daß fließfähiges Saftkonzentrat mit einer Temperatur unter 32°F (0°C) ausgebbar ist, Einrichtungen zur derartigen Druckbeaufschlagung des Kanisters (32) vorgesehen sind, daß der Druck im Kanister (32) das Konzentrat in die Konzentratleitung (38) drückt, und daß Einrichtungen (40) zum Erwärmen des Konzentrats in der Konzentratleitung (38) vorgesehen sind.
2. Vorrichtung nach Anspruch 1, bei der die Heizeinrichtung (40) eine Umwälzwasserleitung (59) umfaßt, welche in Wärmeübertragungszuordnung zu der Konzentratleitung (38) vorgesehen ist.

3. Vorrichtung nach Anspruch 1 oder 2, bei der die Dosiereinrichtung (20) eine volumetrische Kolbenpumpe wenigstens in der Konzentratleitung (38) oder der Wasserleitung (18) aufweist.

4. Vorrichtung nach Anspruch 3, welche eine volumetrische Kolbenpumpe in jeder der Leitungen (18, 38) umfaßt, und bei der das Verhältnis der Pumpvolumina das gewünschte Mischverhältnis ist.

5. Vorrichtung nach Anspruch 1 oder 2, bei der die Dosiereinrichtung eine Mikrosteuereinrichtung (82), einen Durchflußmesser (80) in der Wasserleitung und ein motorisch angetriebenes Steuerventil (92) in der Wasserleitung (18) umfaßt, wobei der Durchflußmesser (80) und das motorisch angetriebene Steuerventil (92) mit der Mikrosteuereinrichtung (82) verbunden sind.

6. Vorrichtung nach Anspruch 5, welche einen Konzentratvorratsbehälter (102), eine Einrichtung (130), welche den Vorratsbehälter automatisch mit Konzentrat gefüllt hält, wobei die Konzentratleitung (132) das Konzentrat von der Heizeinrichtung dem Vorratsbehälter (102) zuleitet, und eine Einrichtung (134, 144) zum Zuleiten eines gesteuerten Konzentratvolumens von dem Vorratsbehälter (102) zu der Mischkammer (103) während der Ausgabe umfaßt.

7. Vorrichtung nach Anspruch 6, bei der die Zufuhreinrichtung eine Pumpe (134) und einen Gleichstrommotor (140) mit einem Kodierer (142) aufweist, der mit der Mikrosteuereinrichtung (130) verbunden ist.

8. Vorrichtung nach Anspruch 7, bei der die Pumpe eine Pumpe (134) mit biegsamen Schaufeln ist.

9. Vorrichtung nach Anspruch 1 oder 2, welche ein magnetisch gesteuertes Ein/Aus-Ventil (122) in der Wasserleitung umfaßt.

10. Vorrichtung nach einem der vorangehenden Ansprüche, bei der der druckbeaufschlagbare Kanister (32) einen abnehmbaren Verschlussdeckel (48) und einen Beutel (30) für das fließfähige Saftkonzentrat umfaßt, der im Kanister (32) sich befindet.

11. Vorrichtung nach Anspruch 10, bei der der Konzentratbeutel (30) auf einer Temperatur von etwa -10°F (-23°C) bis 0°F (-18°C) ist.



12. Vorrichtung nach einem der vorangehenden Ansprüche, bei der die Druckbeaufschlagungseinrichtung eine unter Druck stehende CO₂-Quelle (34) und einen Druckregler (36) umfaßt.

5

13. Verfahren zum Wiederaufbereiten und Ausgeben von Saft, welches aufweist:

(a) Ausdrücken von Saftkonzentrat aus dem Behälter (30) in eine Konzentratleitung (38);

(b) Zuleiten des Konzentrats zu einer Dosiereinrichtung (20);

10

(c) Zuführen von Wasser zu einer Dosiereinrichtung (20); und

(d) Zuleiten eines gesteuerten Verhältnisses von Wasser zu Konzentrat zu einer Mischkammer (16),

15

dadurch gekennzeichnet, daß

der Saft fließfähig ist und bei einer Temperatur von unter 32° F (0° C) aus dem Behälter herausgedrückt wird, welcher in Form eines Beutels vorliegt, sowie unter Anwendung eines Erwärmungsschrittes für das Konzentrat in der Konzentratleitung (38) über 32° F (0° C).

20

14. Verfahren nach Anspruch 13, bei dem der Saft 5 + 1 Orangensaft ist, und der Schritt zum Herausdrücken aufweist, daß ein flexibler Beutel (30) mit dem Konzentrat bei einer Temperatur von etwa -10° F (-23° C) bis 0° F (-18° C) in einen druckbeaufschlagbaren Kanister (32) gelegt wird, und daß der Kanister (32) mit CO₂ bei etwa 40 psig druckbeaufschlagt wird.

25

30

35

40

45

50

55

8