Abstract: A device (1) for producing pressurized water or cold water comprising: a water heating and storing tank (5); a steam generator (6); a cold water source (13); at least one pressurizable transfer tank (4) provided with: at least an inlet (14) for filling the tank (4) with water, an inlet (7) for introducing steam from the steam generator (6), and an outlet (8) for evacuating pressurized water; and separate valve means (31, 91, 71) to respectively fill the tank (4) with water, introduce steam in the tank, and evacuate pressurized water from the tank (4).
Published:

— with international search report (Art. 21(3))
TITLE OF THE INVENTION

DEVICE AND PROCESS FOR PRODUCING PRESSURIZED WATER AND THEIR USE FOR PRODUCING BEVERAGES

BACKGROUND

[0001] The present invention relates to a device for producing pressurized hot or cold water and its use to produce hot and cold beverages.

[0002] Beverage production machines can produce beverages by mixing a food ingredient concentrate - either a powder or a liquid concentrate with a diluent such as hot or cold water. To provide more hygienic designs of such devices, product contact surfaces, loose parts requiring cleaning and maintenance, such as seals, impellers and the like are minimized. These machines beneficially utilize mixerless means, such as: a) spraying one of more of the ingredients under pressure thereby creating turbulent agitation to facilitate mixing; or b) creating a turbulent condition within an internal static mixing device.

[0003] To accomplish the aforementioned requires the delivery of water under pressure to enable a good mixing of the diluent with the food concentrate and sometimes to foam the beverage that is formed from the dilution. The production of pressurized water is currently accomplished using mechanical water supply pumps and/or the pressure from the municipal water supply, in conjunction with other elements such as check valves, orifice restrictors, adjustable pressure regulators (all of which can adversely impact cost, space need and hygiene).

[0004] In very small consumer personal use type beverage brewing/reconstituting/capsule appliances it is not uncommon for cold water to be pumped and then heated for the production of hot beverages. The inexpensive mechanical pumps that are used generate a lot of noise and although they are able to provide a high pressure delivery they have very limited flow capability. Alternatively, pumps capable of supplying pre-heated water are typically fairly expensive and subject to scaling. For commercial foodservice production machines that produce a large number of beverages per day, such as foodservice machines, the pressurization with such pumps cannot be achieved.

[0005] US 6,405,637 describes a pump that provides hot water and steam in a single unit. However, this pump can only provide heated water on a batch dispensing basis and not a continuous flow of heated water. Due to this batch dispensing, it is difficult to sustain the delivery of more than 5 cups per minute. This rate is not an issue when the
beverage is produced for domestic applications using a beverage ingredient cartridge but, this rate is too low when the beverage is produced from a beverage ingredient stored in a large container, such as a bag-in-box, for a foodservice application considering the higher beverage throughput needs where cups per unit time is a significant factor.

SUMMARY

[0006] The present invention provides for the economical delivery of hot water at a high flow rate and high pressure on a sustained basis.

[0007] According to an embodiment, a device is provided for producing pressurized hot or cold water comprising:

- a water tank for heating and storing water;
- a steam generator;
- a cold water source;

at least one pressurizable transfer tank provided with: at least an inlet for filling the tank with water; an inlet for introducing steam from the steam generator; and an outlet for evacuating pressurized water; and

separate valve means to respectively fill the tank with water, introduce steam into the tank, and evacuate pressurized water from the tank.

[0008] The pressurizable transfer tank is generally linked to the different sources of water by: at least a water line connecting the water tank and/or the cold water source to the pressurizable transfer tank; a cold water line connecting the cold water source to the pressurizable transfer tank; and a steam line connecting the steam generator to the pressurizable transfer tank.

[0009] According to an embodiment of the device, the pressurizable transfer tank can be provided with a first and a second inlet for filling the tank with water, the first inlet filling the tank with hot water from the water tank and the second inlet filling the tank with cold water from the cold water source.

[0010] The device in a preferred embodiment comprises valve means on each of the lines connected to the pressurizable transfer tank. The valve means are associated with the inlet for filling or introducing fluids into the pressurizable transfer tank, admit fluids into the pressurizable transfer tank, and prevent a reverse fluid flow. Preferably, a pressure relief valve can be installed at the outlet pipe of the pressurizable transfer tank.
[0011] A line connection can be provided between the water tank and the steam generator. Then the steam generator can be fed with the hot water produced by the water tank acting as a hot water supply.

[0012] Preferably, the device of the present invention comprises a controller that controls the separate valve means and monitors: the filling of the tank either with cold or hot water; the introduction of steam to pressurize water filled in the tank; and the evacuation of pressurized water.

[0013] Preferably, the inlet for introducing steam into the pressurizable transfer tank is placed near the top side of the pressurizable transfer tank and steam distributor means are provided inside the tank near its top side. The steam distributor means evenly distributes the steam across the entire surface of the water thereby minimizing steam mixing with the water. It also minimizes the heating of ambient or chilled water in the tank. The steam distributor means can be a mesh screen or a manifold.

[0014] According to another embodiment of the device, it comprises a first and a second pressurizable transfer tank and the inlet for filling the tank with water of the first tank is connected to the water tank and the inlet for filling the tank with water of the second tank is connected to the cold water source. This embodiment provides the advantage of constantly generating pressurized hot water and pressurized cold water either in the first or in the second tank. In contrast, the previous embodiment of the device only enables the successive production of pressurized hot water and then of pressurized cold water due to the existence of only a single tank. The tank must be totally empty before the temperature of the pressurized water can be modified.

[0015] According to another embodiment, the present invention provides a machine for producing beverages comprising an apparatus for preparing and dispensing a beverage from a concentrated ingredient connected to the outlet of the device for producing pressurized hot or cold water as described above.

[0016] The apparatus for preparing and dispensing a beverage from a concentrated ingredient can comprise: mixing means; at least a source of concentrated ingredient; ingredient dosing means; and dispensing means.

[0017] The mixing means can be a mixing chamber with or without a whipper. Due to the pressure of the water introduced into the mixing chamber, efficient mixing can occur by a simple whirling of the water and food ingredient.
In an embodiment, the mixing means, the ingredient dosing means and the dispensing spout can be integrated into a single cap connected to the source of concentrated ingredient, to the pressurizable transfer tank and to a motor. Such a cap is described in the application WO 2006/005401. The motor is connected to the ingredient dosing device to deliver a dose of ingredient.

According to another embodiment, the machine can comprise a steam line connecting the steam generator of the device for producing pressurized hot or cold water also to the apparatus for preparing and dispensing a beverage from a concentrated ingredient. The steam line enables the delivery of steam, at the beverage machine side, to froth the beverage during or further to its production.

Preferably, the volume of the pressurizable transfer tank of the device for producing pressurized hot or cold water is about the same volume of the intended size for the specific application to be produced by the machine, for example, a cup size. In that situation the pressurizable transfer tank can be totally emptied each time a beverage is produced. For larger cups, the beverage can be produced according to a batch procedure.

According to an embodiment, the device of the present invention can comprise more than one pressurizable transfer tank, each presenting a different volume. The volume can depend on the type of beverage it is intended to deliver. For example, one pressurizable transfer tank can be defined for producing both espresso and long coffee; then the volume can be about 50 ml. Another pressurizable transfer tank can be defined for producing long coffee and Carafe's; then the volume can be about 250 ml. And another channel pressurizable transfer tank can be defined for producing carafe and catering; then the volume can be at least 1 l.

According to another embodiment, the device of the present invention can comprise a pressurizable transfer tank wherein the volume can be adjusted for the type of beverage that is intended to be delivered by the machine.

In an embodiment, the invention provides a method for producing pressurized hot or cold water comprising: providing hot water; providing steam; providing cold water; filling a pressurizable transfer tank with either the cold or hot water, the tank comprising an outlet; and introducing steam into the tank so that steam pushes water in the tank through the tank outlet.

The steam pushes the water in the tank through the tank outlet as it expands in the tank.
[0025] The amount of pressure generated by the pressurized water is generally controlled at least by the pressure of the steam provided to the tank and/or the volume of the pressurizable transfer tank.

[0026] Additional features and advantages are described herein, and will be apparent from the following Detailed Description and the figures.

**BRIEF DESCRIPTION OF THE FIGURES**

[0027] Figure 1 is a schematic diagram of an embodiment of a machine for producing beverages integrating an embodiment of a device for producing hot and cold pressurized water according to the present invention.

[0028] Figures 2 and 3 are exploded views of a cap integrating mixing means, ingredient dosing means and a dispensing spout connectable to an embodiment of a device for producing hot and cold pressurized water according to the present invention.

**DETAILED DESCRIPTION**

[0029] Referring now to the figures, Figure 1 schematically depicts a device 1 comprising a water tank 5 for heating and storing water having a cold water source 3 that can be, for example, domestic cold water from an ordinary pressurized utility water supply line. The water tank 5 can be any kind of boiler that heats water without pressurizing it. The water tank provides hot water through line 10 to a steam generator 6.

[0030] In an embodiment, the device comprises a pressurizable transfer tank 4 connected to: the cold water source 3 through an inlet 14 to provide cold water to the pressurizable transfer tank 4; the water tank 5 through an inlet 9 to provide hot water to the pressurizable transfer tank 4; and the steam generator 6 through an inlet 7 to provide steam to the pressurizable transfer tank 4.

[0031] The pressurizable transfer tank also comprises an outlet pipe 8. This outlet can be placed near the bottom of the tank 4 so that all the water in the tank can be pressurized and dispensed. The orientation of the discharge tube and its position relative to the other parts of the device can be selected to adjust the quantity of the water being delivered.

[0032] Valve means are provided to control the intake of the different fluids in the different parts of the device 1 of the present invention: valve means 11 and 31 control the intake of cold water respectively in the water tank 5 and in the pressurizable transfer tank 4; valve means 101 and 91 control the intake of hot water respectively in the steam generator 6.
and in the pressurizable transfer tank 4; and valve means 71 control the intake of steam in the pressurizable transfer tank 4.

[0033] Valve means 81 are also provided on the pipe 8 for evacuating pressurized water from the pressurizable transfer tank 4. The valve means 81 are preferably a pressure relief valve. The valve means 91 for the intake of hot water in the pressurizable transfer tank 4 and the valve means 31 for the intake of cold water in the pressurizable transfer tank 4 can be typical open valves.

[0034] The pressurizable transfer tank 4 functions as follows. Depending on if hot or cold pressurized water must be produced, either intake valve means 31 or 91 is opened to fill the pressurizable transfer tank with hot or cold water coming either from the cold water source 3 or from the water tank 5. Then when there is a need for pressurized water, valve means 71 are opened to introduce steam in the pressurizable transfer tank and valve means 81 are opened to allow pressurized water to flow out of the pressurizable transfer tank.

[0035] Preferably, the pressurizable transfer tank 4 comprises a distributor device 12 to distribute steam coming from the inlet 7 across the entire surface of the water in the tank 4. This distributor device can be a grid.

[0036] The pressure at which the water is evacuated from the outlet 8 depends from the amount of steam pressure introduced into the pressurizable transfer tank 4. Typically, water with a pressure of at least 2 bar can be obtained at the outlet of the pipe 8. The delivered pressure can be adjusted based on the steam pressure and temperature conditions.

[0037] The device of the present invention preferably comprises a controller 13 that controls the opening and closing of the different valve means 11, 101, 91, 31, 71, and 81. The controller 13 particularly monitors: the filling of the pressurizable transfer tank 4 either with cold or hot water; the introduction of steam to pressurize water filled in the pressurizable transfer tank 4; and the evacuation of pressurized water from the pressurizable transfer tank 4.

[0038] According to an embodiment, two tanks 4 can be used with one being connected only to the water tank as a water source, and the other being connected only to the cold water source as a water source.

[0039] The device 1 for producing pressurized water, such as described above, can be a part of a machine for producing beverages 2. The machine can comprise at least mixing means 21 into which the pressurized water is introduced and mixed with a dose of a concentrated food ingredient delivered from a concentrated food ingredient container 23
using the dosing means 22. The concentrated food ingredient can be either a powder or a liquid concentrate. The invention particularly concerns food ingredients that are either cold, chilled or hot, such as coffee, milk, chocolate, soup, tea, etc. Depending on the liquid or powder form of the concentrated food ingredients, the container 23 can be either a canister, a box or a pouch, such as a bag-in-box. The dosing means can be an auger or a rotating pierced plate or any other dosing means known for dosing powder. For liquid ingredients, the dosing means can be a pump that applies pressure on a flexible tube connecting the container 23 to the mixing means 21.

[0040] According to an embodiment of the present invention, the mixing means, the ingredient dosing means and the dispensing spout can be integrated in a single cap connected to the source of concentrated ingredient. The cap provides a connection to the pressurizable transfer tank 4 that dilutes the pressurized water. The cap can also provide a connection to a motor to activate the dosing means.

[0041] Because the water is pressurized, the mixing chamber can be a static mixing chamber without any whipping means. However, whipping means can also be present according to the present invention. The mixing chamber can comprise dispensing means 24 to evacuate the beverage, such as a nozzle, which can improve the texture of the beverage or simply orient its flow to the final beverage container 25.

[0042] Optionally, the mixing chamber 21 can be connected to at least the cold water source 3, the cold water generator 5 and/or the steam generator 6 by connecting the mixing chamber 21, respectively, to the pipe 17 that is connected to the cold water source 3, to the pipe 16 that is connected to the water tank 5 and to the pipe 15 that is connected to the steam generator 6, in order to control: the temperature of the final beverage; the volume of the final beverage; or the texture of the beverage. Valve means 102, 92, and 32 can be controlled by the controller 13 depending of the desired properties of the final beverage. Texture essentially refers to the frothing/foaming of the beverage.

[0043] Figures 2 and 3 illustrate a metering and mixing device 100, in the form of a cap, which seals the opening of the container 23 when the container is in an inverted position with its opening facing downwardly. The cap also replaces the mixing chamber 21 and the dispensing means 24. The cap has a tubular connecting portion 101 equipped with connecting means such as an internal screw thread that complements connecting means on the container, that are also of a screw thread type, for example. The device 100 is preferably made of, among other things, two half-shells 100A, 100B assembled to one another along a
parting line running more or less in the longitudinal direction of the ducts, particularly of the liquid duct and of the mixing chamber, circulating within the device. The cap 100 comprises a built-in metering pump for metering the liquid passing through the opening 103.

[0044] The pump is preferably a gear pump as described in WO-A-2006/005401. The pump is defined by a chamber 104 equipped with bearings at the bottom of each lateral surface of the chamber and able to guide two rotary elements 105, 106 cooperating in a geared fashion in order to form the moving metering elements of the pump in the chamber. The rotary element 106 is a "master" element equipped with a shaft that is associated with a coupling means that is able to engage with complementary coupling means in the base station. The rotary element 105 is the "slave" element which is driven in a direction that is opposite to that of the rotation of the master element so as to meter the liquid through the chamber 104.

[0045] The half-shells as so constructed and arranged such that the chamber 104 is defined by assembly of the two parts 100A, 100B. The chamber 104 may have a hollow frontal part 100B with a bottom surface defining one of the lateral surfaces. The other part encloses the chamber via a more or less flat surface portion. Liquid is thus metered through the liquid outlet duct.

[0046] The device comprises a duct 102 for supplying water which intersects the liquid food ingredient duct 107. This duct 102 is connected to the outlet pipe 8 of the pressurizable transfer tank 4 so that pressurized water can be introduced in the cap to mix with the food ingredient.

[0047] According to an embodiment, the water duct 102 can also be connected to the cold water source 3, the cold water generator 5 and/or the steam generator 6 by connection of the mixing chamber 21, respectively, to the pipe 17 connected to the cold water source 3, to the pipe 16 connected to the water tank 5, and to the pipe 15 connected to the steam generator 6. The water duct 102 and the food ingredient metering duct 107 are not directly positioned so as to intersect one another, but meet in the mixing chamber 108. The water duct 102 nevertheless is positioned such that its flow is directed toward the liquid flow, i.e., in the direction of the liquid outlet or slightly below. Alternatively, the liquid and diluent ducts can meet upstream of the chamber 108 so that the same duct transports the fluids to the chamber 108. Such a duct may be widened as to reduce the pressure drop and allow for an increase in the volume of the fluid before it extends into the mixing chamber 108 proper. Restricting the width allows one to accelerate the water flow causing, due to the
venturi phenomenon, a pressure at the meeting point that is lower than or equal to the pressure of the liquid in the liquid outlet duct 107. When the pump is switched off, the equilibrium or differential pressures, ensures that the water crosses the metering point and travels as far as the chamber without moving back up inside the liquid duct. The liquid pump stops while the diluent continues to pass through the device, for example, towards the end of the drink preparation cycle in order to obtain the desired dilution of drink. Likewise, the diluent is used to regularly rinse the device. Thus the liquid, for example, a coffee or cocoa concentrate, is prevented from being contaminated in the container or the pump due to diluent being sucked back through the duct 107.

[0048] An air intake, defined by an air duct 109 open to the outside, via a hole provided in half shell 100A is preferably used when frothing of the liquid-diluent mixture is desired. As illustrated in Figure 3, the air intake or channel 109 can be positioned to intersect the water duct 102. Therefore, it is placed before the intersection of the liquid stream and diluent stream. The air intake 109 may be positioned in the region of the restriction 110. The water speed is such in that region that air is sucked in the water stream before the stream meets the liquid stream. Such a design reduces the risk of the air intake being contaminated with the diluted product coming in the air intake by accident.

[0049] It should be noted that the above-mentioned embodiments illustrate rather than limit the invention, and that those skilled in the art will be able to design many alternative embodiments without departing from the scope of the appended claims. The word "comprising" does not exclude the presence of elements or steps other than those listed in a claim. The word "a" or "an" preceding an element does not exclude the presence of a plurality of such elements. The mere fact that certain measures are recited in mutually different dependent claims does not indicate that a combination of these measures cannot be used to advantage.

[0050] The device of the present invention provides the advantage of not only providing hot and/or cold pressurized water, but also steam and non pressurized cold or hot water. When it is coupled to a machine for producing beverages, it enables the production of a wide range of different beverages either hot or not, frothed or not, long or short.

[0051] In the present application, "cold water" means ambient temperature water or chilled water.
[0052] Pressurized water produced by the pressurization device of the present invention is also helpful in beverage producing machine comprising venturi devices to drawn in air for foaming.

[0053] The device of the present invention in an embodiment can produce hot water at high flow rate (15-30 ml/s) on a sustained basis and at a pressure greater than 1 bar.

[0054] It should be understood that various changes and modifications to the presently preferred embodiments described herein will be apparent to those skilled in the art. Such changes and modifications can be made without departing from the spirit and scope of the present subject matter and without diminishing its intended advantages. It is therefore intended that such changes and modifications be covered by the appended claims.
CLAIMS

The invention is claimed as follows:

1. Device for producing pressurized hot or cold water comprising:
   a water tank;
   a steam generator;
   a cold water source;
   at least one pressurizable transfer tank comprising: an inlet for filling the tank with water, an inlet for introducing steam from the steam generator, and an outlet for evacuating pressurized water; and
   separate valve means to respectively fill the tank with water, introduce steam in the tank, and evacuate pressurized water from the tank.

2. Device according to Claim 1 wherein the pressurizable transfer tank comprises a first and a second inlet for filling the tank with water, the first inlet filling the tank with hot water from the water tank and the second inlet filling the tank with cold water from the cold water source.

3. Device according to any of Claims 1 to 2 comprising a controller that controls the separate valve means and monitors:
   the filling of the pressurizable transfer tank either with cold or hot water;
   the introduction of steam to pressurize water filled in the pressurizable transfer tank;
   and
   the evacuation of pressurized water from the pressurizable transfer tank.

4. Device according to any of Claims 1 to 3 comprising a fluid line between the water tank and the steam generator.

5. Device according to any of Claims 1 to 4 wherein the inlet for introducing steam in the pressurizable transfer tank is placed near the top side of the pressurizable transfer tank and steam distributor means are provided inside the tank near its top side.
6. Device according to any of Claims 1 to 5 comprising a first and a second pressurizable transfer tank and the inlet for filling the tank with water of the first tank is connected to the water tank and the inlet for filling the tank with water of the second tank is connected to the cold water source.

7. Machine for producing beverages comprising an apparatus for preparing and dispensing a beverage from a concentrated ingredient connected to the outlet of the device for producing pressurized hot or cold water comprising:
   a water tank;
   a steam generator;
   a cold water source;
   at least one pressurizable transfer tank comprising: an inlet for filling the tank with water, an inlet for introducing steam from the steam generator, and an outlet for evacuating pressurized water; and
   separate valve means to respectively fill the tank with water, introduce steam in the tank, and evacuate pressurized water from the tank.

8. Machine according to Claim 7 wherein the apparatus for preparing and dispensing a beverage from a concentrated ingredient comprises:
   mixing means;
   at least a source of concentrated ingredient;
   ingredient dosing means; and
   dispensing means.

9. Machine according to any of Claims 7 to 8 wherein the mixing means, the ingredient dosing means, and the dispensing spout are integrated in a single cap connected to the source of concentrated ingredient.

10. Machine according to any of Claims 7 to 9 comprising a steam line connecting the steam generator to the apparatus for preparing and dispensing a beverage from a concentrated ingredient.
11. Machine according to any of Claims 7 to 10 wherein the volume of the pressurizable transfer tank of the device for producing pressurized hot or cold water has a volume that is approximately the same as the smallest beverage to be produced by the machine.

12. Method for producing pressurized hot or cold water comprising:
   providing hot water;
   providing steam;
   providing cold water;
   filling a pressurizable transfer tank with either cold or hot water, the tank comprising an outlet; and
   introducing steam into the tank so that the steam pushes water in the tank through the tank outlet.

13. Method according to Claim 12 wherein the pressure generated by the pressurized water is controlled by the pressure of the steam provided to the tank and/or the volume of the pressurizable transfer tank.
INTERNATIONAL SEARCH REPORT

International application No
PCT/US2009/068948

A. CLASSIFICATION OF SUBJECT MATTER
INV. A47J31/30  A47J31/56
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED
Minimum documentation searched (classification system followed by classification symbols)
A47J

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, MPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
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<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
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<td>paragraph [0014] - paragraph [0022]; figure 1</td>
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<td>DE 14 54 231 A1 (WMF WURZTEMBERG METALLWAREN) 27 February 1969 (1969-02-27)</td>
<td>1,12</td>
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<td>page 5, Line 12 - page 12, line 16; figures 1-6</td>
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Further documents are listed in the continuation of Box C.

* Special categories of cited documents:
  * "A" document defining the general state of the art which is not considered to be of particular relevance
  * "E" earlier document but published on or after the international filing date
  * "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
  * "O" document referring to an oral disclosure, use, exhibition or other means
  * "P" document published prior to the international filing date but later than the priority date claimed
  * "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
  * "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
  * "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
  * "&" document member of the same patent family

Date of the actual completion of the international search
19 November 2010

Date of mailing of the international search report
26/11/2010

Name and mailing address of the ISA/
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Authorized officer
Lehe, Jorn

### INTERNATIONAL SEARCH REPORT

**Box No. II** Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. **☐** Claims Nos.: because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.: because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☒ Claims Nos.: because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

### Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☒ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

**Remark on Protest**

- ☒ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.

- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.

- ☒ No protest accompanied the payment of additional search fees.

International application No. PCT/US2009/068948

Form PCT/ISA/21 0 (continuation of first sheet (2)) (April 2005)
This International Search Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-6, 12, 13
   Pressurizable transfer tank with first and second inlet

2. claims: 7-11
   Machine comprising mixing means
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