Note: Within nine months from the publication of the mention of the grant of the European patent, any person may give notice to the European Patent Office of opposition to the European patent granted. Notice of opposition shall be filed in a written reasoned statement. It shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).
Description

Field of the Invention

[0001] The invention relates to a beer-dispensing device according to the preamble of claim 1.

Background of the Invention

[0002] An apparatus is known for dosing and dispensing frothing liquids from isothermal containers, the apparatus comprising a system for delivering compressed gas with a pressure regulator, a surplus pressure release valve, a liquid level gauge, a cooling system comprising an evaporator, valves of liquid delivery and an additional container communicating with the isothermal container through a separating valve (see Inventor's Certificate SU No 1142435, class B 67 D 1/00, from 3 October 1983).

[0003] A disadvantage of the known device is the limitation of functional capabilities, since its construction does not make its use in a multipoint dispensing system possible with preservation of all the initial parameters of the beverage.

[0004] A beer-dispensing device is known, comprising an isothermal container with beer, a beer supercharge system, a cooling system and a dispenser, equipped with a system of pipelines with cocks for delivering beer to be dispensed and a pipeline for feeding the beer to the dispenser (see patent JP 2703006 B2 2166092A, from 15 December 1988, published in "Inventions of the World," issue 34, No. 2/99, p. 39).

[0005] However, this known device is not capable of preserving all the initial parameters of the beverage when it is used in a multipoint beer-dispensing system, especially when dispensing non-filtered beer, requiring an especially strict temperature mode during all stages of dispensing.

[0006] DE 43 07 415 C1 describes a beer dispensing device having a container for a beverage connected by means of pipelines with corresponding beverage delivery cocks, wherein in each pipeline is arranged an automatic valve functionally connected to a flow-meter and with an electronic device allowing an automatic proportioning of the beverage as well as an identification of authority of the using person.

[0007] From WO 99/60092 is known a beverage dispensing device providing a non-return valve in a main beverage-delivery pipeline in the vicinity of a container for a beverage. The main beverage-delivery pipeline is further provided with a pump for pressurizing the beverage and with a heat exchange coil in a remote cooling system.

[0008] GB 1 525 252 relates to a flow measuring device comprising a totalling device coupled to a flow measuring mechanism to register and to indicate a total of measured flow, and a foam sensor installed in the liquid to be measured and adjacent to the flow measuring mechanism to provide an output signal in the presence of foam, which output signal is operative to interrupt operation of the totalling device, whereby the totalling device registers only the total of liquid flow through the flow measuring mechanism.

[0009] Furthermore, the construction of the known device cannot provide the necessary convenience during the use thereof in a multipoint dispensing system.

Disclosure of the Invention

[0010] The object of the invention is to develop a device that provides preservation of the initial parameters of the beverage in a multipoint beer-dispensing system and also convenience in operation as a result of simplifying the delivery of beer to a consumer with the necessary control of its quality.

[0011] This object is attained in a beer-dispensing device according to claim 1. The device comprises a cooling system, at least one isothermal container for a beverage, to which a dispenser is connected through a main beer-delivery pipeline, the dispenser being equipped at outlets with a system of subsidiary pipelines with beer-delivery cocks for dispensing, in that in accordance with the invention, the dispenser comprises N closed circuits of beverage lines for circulating the beverage to be dispensed, where N is a whole number, and is provided with a pump for circulating beer along the dispenser and with a beer cooler, and a holding valve is arranged on the main beer-delivery pipeline.

[0012] Furthermore, a flow homogeneity sensor reacting to appearance of gas bubbles in the flow may be arranged on the main beer-delivery pipeline and an electromagnetic valve is arranged on each outlet of the aforesaid closed circuits and is functionally connected to the aforesaid flow homogeneity sensor, and also a holding valve may be arranged in each closed circuit, and in addition to this the device may be provided with a system, for pressurisation the beverage.

[0013] Furthermore, in accordance with the invention, a flow meter that is functionally connected to a counter for registration of the amount of beer is arranged for each cock for delivering beer for dispensing, and an electromagnetic valve is functionally connected to the counter for registration of the amount of beer.

[0014] The essence of the invention is that the realization of the dispenser with N closed circuits of the beverage lines connected to one general pipeline provided with a pump for circulating beer along the dispenser and a cooler and insertion of the holding valve and flow homogeneity sensor makes it possible to ensure the necessary temperature...
conditions in all the distribution circuits and to exclude the entrance of off-standard beverage with an excessive amount of foam.

[0015] The arrangement of the holding valve on the main beer-delivery pipeline in the dispenser excludes the return of beer from the dispenser circuit and ensures normal functioning of the multipoint beer-dispensing system.

[0016] The presence of the flow homogeneity sensor excludes the delivery of off-standard beer to a customer.

Brief Description of the Drawings

[0017] Fig. 1 shows a beer-dispensing device, and Fig. 2 shows a variant of its embodiment with N = 2 closed circuits.

Best Method of Carrying Out the Invention

[0018] The beer-dispensing device (Fig. 1) comprises an isothermal beverage container 1 for the final beer product, a system 2 for pressurization of the beer, a cooling system 3 with a pump 4, a dispenser 5 connected to the isothermal container 1 by a main pipeline 6 for delivery of beer to the dispenser 5 and equipped with system of pipelines with cocks 7 for delivering beer for dispensing. A holding valve 8 is arranged on the pipeline 6, and the dispenser 5 is made in the form of N closed circuits of beverage lines, where N is a whole number, and equipped with a pump 9 for circulating beer along it, and with a beer cooler 10 connected to the cooling system 3.

[0019] The beer cooler 10 can be made in accordance with the "tube in tube" principle or in the form of a plate heat exchanger arranged on a separate section of the dispenser 5 or along the whole circuit thereof, including the main pipeline 6 for delivering beer to the dispenser 5 and pipelines with cocks 7 for delivery of beer from the dispenser 5 for dispensing.

[0020] A variant of the device (Fig. 2) has a dispenser with N = 2 circuits and additionally contains a flow homogeneity sensor 11 arranged in the main pipeline 6 for delivering beer to the dispenser 5, and an electromagnetic valve 12 functionally connected to a flow homogeneity sensor 11 and corresponding flow meter 13 and counter 14 for the registration of the amount of beer, which perform the role of a unit for calculating the amount of the beverage. The flow meter 13, for example, of the MAC 435 type, serves to convert the beverage flow into electrical pulses, and the counter 14, for example, of the "Rescontrol" type, Finland, converts the electric pulses from the flow meter 13 into the amount of consumed beverage, for example, into "ml."

[0021] Furthermore, a holding valve 15 for providing one-way flow through the circuit is arranged in each closed circuit. The closed circuits of the device 5 are connected as individual pipelines 17 to one general pipeline 16 in which are arranged a pump 9 and a cooler 10. The general pipeline 16 is connected to an input 18 of the dispenser 5 to which the second output of the main pipeline 6 is connected, and the outputs 19 of the dispenser 5 are made by outlets from the individual pipelines 17.

[0022] Each of subsidiary pipelines 20 is connected by one outlet to a corresponding output 19 of the dispenser 5, and the electromagnetic valve 12, functionally connected to the flow homogeneity sensor 11, is arranged on at least one subsidiary pipeline 20.

[0023] Furthermore, the electromagnetic valve 12 may be functionally connected to a corresponding unit for calculating the amount of the beverage if fixed delivery of the beverage is required.

[0024] The beer cooler 10 may be made according to the "tube in tube" principle or in the form of a plate heat exchanger on a separate section of the device 5 or along all of its circuits.

[0025] The main pipeline 6 and subsidiary pipelines 20 can also be provided with coolers which may be connected to the cooling system 3.

[0026] In order to expand the functional capabilities, the system may be provided with at least one additional container for the beverage (not shown in the drawing) that can be arranged with the possibility for its connection to at least one dispensing cock 7 arranged on a bar.

The Device Operates in the Following Manner

[0027] The final beer product, cooled by the system 3, is fed from the isothermal container 1 under the pressure of the system 2 along the pipeline 6 through the holding valve 8 and the flow homogeneity sensor 11 to the input 18 of the dispenser 5, where it circulates in its circuit under the action of the pump 9. The cooler 10 provides maintenance of the temperature of the beer in the dispenser 5, from which it is poured into a customer’s container along the pipelines with cocks 7 through the electromagnetic valves 12 and flow meters 13. The holding valve 8 excludes the return of beer from the dispenser to the isothermal container 1.

[0028] The flow homogeneity sensor 11 reacts to the appearance of gas bubbles in the flow (foam) and sends a signal
to all the valves 12, which close at that signal and thus stop the delivery of beer from the dispenser 5. This process takes place when the isothermal container 1 is emptied or when the temperature conditions of storage are disturbed, this resulting in the appearance of foam in a pipe, and thus the delivery of off-standard beer to a customer is eliminated. The arrangement of a flow meter 13, functionally connected to the counter 14, on each cock 7 makes it possible to take the consumption of beer into account, and in some cases, relate them functionally to the electromagnetic valve 12, and dose the beer during dispensing.

[0029] The flow meter 13 provides information on the number of revolutions of its turbine to the counter 14 which acts on the electromagnetic valve 12 when it reaches a predetermined number of revolutions.

[0030] This makes it possible to arrange the cocks 7 on each table in a restaurant and thus simplify the servicing of customers with the necessary control of the beer quality.

[0031] The arrangement of the holding valves 15 makes it possible to maintain stable pressure in the zone of suction of the pump 9, in spite of changes in the consumption of beer from the dispenser 5.

[0032] The possibility for operative connection of an additional container for the beverage to the dispensing cocks of a bar makes it possible to expand the range of beverages without the expensive re-equipment of the system, wherewith the additional container for the beverage may be made in transport embodiment.

[0033] Thus, in the proposed device a reliable workability is achieved under conditions of a multipoint beer-dispensing system with maintenance therein of the initial parameters of the beverage.

[0034] The aforesaid device makes it possible to simultaneously carry out independent dispensing of different beverages, using containers with different beverages, connecting corresponding dispensers 5 to them through the main pipelines, thus ensuring the necessary stability of the parameters of the beverage and corresponding dispensing cocks are connected to outlets of the dispenser through subsidiary pipelines.

Industrial Applicability

[0035] The indicated advantages of the proposed beer-dispensing device provide the possibility for broad use in the food industry.

Claims

1. A beer-dispensing device comprising

   - at least one isothermal container (1) for a beverage with a cooling system (3) and
   - a dispenser (5) connected through a main beer-delivery pipeline (6) to the isothermal container (1),

   wherein the dispenser (5)

   - is equipped at its outlets (19) with a system of subsidiary pipelines (20) with beer-delivery cocks (7),
   - comprises N closed circuits of beverage lines for circulating the beverage to be dispensed, where N is a whole number, and
   - is provided with a beer cooler (10) and with a pump (9) for circulating beer along the dispenser (5),

characterized in that

   - on the main beer-delivery pipeline (6) are arranged

      -- a holding valve (8) excluding the return of beer from the dispenser (5) to the isothermal container (1) and
      -- a flow homogeneity sensor (11) reacting to appearance of gas bubbles in the flow,

   - wherein said N closed circuits of the beverage lines of the dispenser (5) are individual pipelines (17) being connected to one general pipeline (16),
   - wherein said general pipeline (16) is connected to an input (18) of the dispenser (5),
   - wherein an output of the main beer-delivery pipeline (6) is connected to the input (18) of the dispenser (5), and
   - wherein the pump (9) and the cooler (10) are arranged in the general pipeline (16).

2. The device according to claim 1, characterized in that an electromagnetic valve (12) is arranged on each outlet (19) of the closed circuits of the dispenser (5), wherein the electromagnetic valve (12) is functionally connected to the flow homogeneity sensor (11).
3. The device according to claim 1 or 2, characterized in that a holding valve (15) is arranged in each closed circuit.

4. The device according to one of the preceding claims, characterized in that it is provided with a system (2) for pressurization of the beverage.

5. The device according to one of the preceding claims, characterized in that a flow meter (13) that is functionally connected to a counter (14) for registration of the amount of beer is arranged for each cock (7) for delivering beer for dispensing.

6. The device according to claim 5, characterized in that the electromagnetic valve (12) is functionally connected to the counter (14).

**Patentansprüche**

1. Bierausgabevorrichtung mit

   - wenigstens einem isothermischen Behälter (1) für ein Getränk mit einem Kühlsystem (3) und
   - einer Ausgabeeinrichtung (5), die über eine Hauptbierförderrohrleitung (6) mit dem isothermischen Behälter (1) verbunden ist,

wobei die Ausgabeeinrichtung (5)

   - an ihren Auslässen (19) mit einem System von Nebenrohrleitungen (20) mit Bierzapfhähnen (7) ausgestattet ist,
   - N geschlossene Kreise von Getränkeleitungen für eine Zirkulierung des auszugebenden Getränks umfasst, wobei N eine ganze Zahl ist, und
   - mit einer Bierkühleinrichtung (10) und mit einer Pumpe (9) für eine Zirkulierung von Bier entlang der Ausgabeeinrichtung (5) versehen ist,

dadurch gekennzeichnet, dass

   - an der Bierhauptförderrohrleitung (6)
     -- ein Halteventil (8), das die Rückkehr von Bier aus der Ausgabeeinrichtung (5) zu dem isothermischen Behälter (1) ausschließt, und
     -- ein Strömungshomogenitätssensor (11) angeordnet sind, der auf das Auftreten von Gasblasen in der Strömung reagiert,

   - wobei die N geschlossenen Kreise der Getränkeleitungen der Ausgabeeinrichtung (5) einzelne Rohrleitungen (17) sind, die mit einer Hauptrohrleitung (19) verbunden sind,
   - wobei die Hauptrohrleitung (16) mit einem Eingang (18) der Ausgabeeinrichtung (5) verbunden ist,
   - wobei ein Ausgang der Bierhauptförderrohrleitung (6) mit dem Eingang (18) der Ausgabeeinrichtung (5) verbunden ist, und
   - wobei die Pumpe (9) und die Kühleinrichtung (10) in der Hauptrohrleitung (16) angeordnet sind.

2. Vorrichtung nach Anspruch 1, durch gekennzeichnet, dass ein elektromagnetisches Ventil (12) an jedem Auslass (19) der geschlossenen Kreise der Ausgabeeinrichtung (5) angeordnet ist, wobei das elektromagnetische Ventil (12) funktionell mit dem Strömungshomogenitätssensor (11) verbunden ist.

3. Vorrichtung nach Anspruch 1 oder 2, durch gekennzeichnet, dass ein Halteventil (15) in jedem geschlossenen Kreis angeordnet ist.

4. Vorrichtung nach einem der vorhergehenden Ansprüche, durch gekennzeichnet, dass sie mit einem System (2) für eine Unterdrucksetzung des Getränkes versehen ist.

5. Vorrichtung nach einem der vorhergehenden Ansprüche, durch gekennzeichnet, dass ein Strömungsmesser (13), der funktional mit einem Zähler (14) zur Registrierung der Biermenge verbunden ist, für jeden Hahn (7) zur Förderung von Bier zur Ausgabe angeordnet ist.
6. Vorrichtung nach Anspruch 5, **dadurch gekennzeichnet, dass** das elektromagnetische Ventil (12) funktional mit dem Zähler (14) verbunden ist.

**Revendications**

1. **Dispositif de distribution de bière**, qui comprend:

- au moins un récipient isotherme (1) pour boisson, doté d’un système de refroidissement (3) et
- un distributeur (5) relié au récipient isotherme (1) par un conduit principal (6) de distribution de bière,

et dans lequel le distributeur (5)

- est doté à ses sorties (19) d’un système de conduits secondaires (20) dotés de robinets (7) de distribution de bière,
- comprend N circuits fermés de conduits de boisson qui font recirculer la boisson à distribuer, N étant un nombre entier et
- est doté d’un refroidisseur (10) de bière et d’une pompe (9) qui fait recirculer la bière dans le distributeur (5),

**caractérisé en ce que**

- sur le conduit principal (6) de distribution de bière sont disposés :

  - une soupape de retenue (8) qui exclut le retour de bière du distributeur (5) vers le récipient isotherme (1) et
  - un détecteur (11) d’homogénéité de l’écoulement qui réagit à l’apparition de bulles de gaz dans l’écoulement,

- lesdits N circuits fermés de conduits de boisson du distributeur (5) sont des conduits individuels (17) reliés à un conduit général (16),
- le dit conduit général (16) est relié à une entrée (18) du distributeur (5)
- la sortie du conduit principal (6) de distribution de bière est reliée à l’entrée (18) du distributeur (5) et
- la pompe (9) et le refroidisseur (10) sont disposés dans le conduit général (16).

2. **Dispositif selon la revendication 1, caractérisé en ce qu’** une soupape électromagnétique (12) est agencée sur chaque sortie (19) des circuits fermés du distributeur (5), la soupape électromagnétique (12) étant reliée fonctionnellement au détecteur (11) d’homogénéité de l’écoulement.

3. **Dispositif selon les revendications 1 ou 2, caractérisé en ce qu’** une soupape de retenue (15) est agencée dans chaque circuit fermé.

4. **Dispositif selon l’une des revendications précédentes, caractérisé en ce qu’** il est doté d’un système (2) de mise sous pression de la boisson.

5. **Dispositif selon l’une des revendications précédentes, caractérisé en ce qu’** un débitmètre (13) qui est relié fonctionnellement à un compteur (14) d’enregistrement de la quantité de bière est prévu pour chaque robinet (7) prévu pour délivrer la bière à distribuer.

6. **Dispositif selon la revendication 5, caractérisé en ce que** la soupape électromagnétique (12) est reliée fonctionnellement au compteur (14).