(54) Title: MODULAR MANIFOLD SYSTEM FOR POST-MIX AND PRE-MIX BEVERAGES DISPENSERS

(57) Abstract

Modular manifold system for distribution of post-mix and pre-mix beverages, whose peculiarity consists in comprising several modular units connected to each other, of which only one connected to the external devices for supplying of still water and carbonated water. Each unit is able to supply, by choice of the user, or a dispensing pre-mix tap, or a post-mix tap with still water, or a post-mix tap with carbonated water or two post-mix taps with still water or carbonated water, allowing furthermore to modify the percentage of carbon dioxide diluted in the carbonated water.
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Modular manifold system for post-mix and pre-mix beverages dispensers

The present invention relates to counter apparatuses for beverages dispensing and in particular to a modular manifold system for distribution of post-mix and pre-mix beverages.

The word manifold system is used in the field of post-mix and pre-mix beverages distribution to indicate the part of the distributing apparatus comprised between the refrigerating device and the beverages dispensing front part and having the aim of feeding the taps of the dispensing front part with pre-mix beverages, syrups, still water and carbonated water necessary to obtain post-mix beverages.

The word post-mix beverage indicates beverages prepared by the producer as syrup or concentrated beverage which need to be diluted with still water or carbonated water before being dispensed. The word pre-mix beverage indicates beverages to be dispensed as prepared by the producer.

In the prior art manifold systems are constituted by units having as inlet the pipelines coming from the refrigerating system and carrying beverages, still water, carbonated water for diluting post-mix beverages, and the fluid (generally water) used for the cooling of the system. The manifold system depends on the type of dispensing front part to which the system has to be connected and in particular from the number and types of taps, such as post-mix taps with still water, post-mix with carbonated water and pre-mix, which such front part includes.

The inconveniences of the modular manifold systems according to such prior art are basically due to the necessity to manufacture different types of units according to the number and types of the taps disposed on the dispensing front part, furthermore once the apparatus has been mounted it is almost impossible to modify the types of taps on the dispensing front part.

A further problem shown by the known systems is the maintainance which is difficult because, almost always, it is necessary to disassemble the whole dispensing front part even when the problem concerns only a single line.

Aim of the present invention is a modular manifold system which allows to obviate to the necessity of manufacturing different types of units according to the number and types of taps disposed on the dispensing front part.

Other aim is to allow, once the apparatus has been mounted, to change the number and type of the taps on the dispensing front part.
Further aim is to allow the mixing of still water and carbonated water inside the same system such to obtain a diluting water of the post-mix beverages with a gassing more suitable to the different types of beverages.

Other aim is to facilitate the assembly manoeuvres and the maintenance services. Not least aim is to obtain a modular manifold system of easy and inexpensive manufacture without using specialized workpeople or sophisticated technologies.

These and further aims are achieved by the modular manifold system according to the invention constituted by at least two units connected to each other, inside each unit two transversal channels being placed fit for being passed by the pre-mix beverages and the syrups for the post-mix beverages, such channels being outside communicating in order to be connected to outside feeding and dispensing devices, each unit comprising three longitudinal channels fit for being passed by still water, by carbonated water and by the refrigerating fluid, and being said modular channels adjacent and communicating each other, each unit comprising three transversal channels outletting on said three longitudinal channels and being outside communicating in order to be connected to outside feeding devices, each unit comprising regulating means which allow to choose which water, still or carbonated, dilutes the syrup, furthermore allowing the regulation of the inflow of the two types of water to a mixing chamber placed inside the same unit and communicating outside through suitable channels, each unit is further provided with gate valves which allow the opening and the closing of the channels fit for being passed by the pre-mix beverages and by the syrups.

The present invention allows through its modular shape to feed a number of dispensing taps which can be freely varied. Thanks to the inner pipeline, to the regulating means and to the gate valves present on each unit, it is possible to vary the type of dispensing taps fed by the single unit. Furthermore it is possible, by means of the mixing chamber and of the regulating means placed on each unit, to mix still water and carbonated water in order to freely vary the gassing of the post-mix beverage supplied by the single unit.

Further characteristics and advantages of the invention will more clearly arise from the following description, made by way of example not limitative, with reference to the enclosed drawings in which:

- Fig. 1 shows an overall view of the manifold system with the dispensing front part, it is further shown the disassembly of an intermediate unit (Fig. 1a);

- Fig. 2 shows an exploded view of a single unit and of the side closing parts of
the system;
- Fig. 3 and Fig. 4 are an axonometric view of a single unit;
- Fig. 5 is an axonometric view, through a transversal section of the unit, of the mixing chamber, of its feeding channels, of the regulating elements and of the nonreturn valves;
- Fig. 6 is an enlarged view of the regulating elements and of the nonreturn valves shown in Fig. 5;
- Fig. 7, Fig. 8 and Fig. 9 are an axonometric view, through longitudinal sections of the unit, of the longitudinal and transversal channels passed by the still and carbonated water and by the refrigerating fluid;
- Fig. 10 is an axonometric view, through transversal sections of the unit, of the mixing chamber, of the closing element of the same and of its outlet;
- Fig. 11 and Fig. 12 are an enlarged view of the gate valves fit for closing the feeding channels of the beverages;
- Fig. 13 and Fig. 14 are an axonometric view, through transversal sections of the unit, of the feeding channels of the beverages and of the gate valves;
- Fig. 15 shows the use of a single unit for feeding two taps with post-mix beverages;
- Fig. 16 shows the use of an unit for feeding a tap with pre-mix beverage;
- Fig. 17 and Fig. 18 show schematically the feeding pipeline network of a dispensing line carried out according to the present invention;
- Fig. 19 shows schematically the feeding pipeline network of a dispensing line carried out according to the state of the art.

A modular manifold system, as the embodiment shown in Fig. 1, has four modular units 1a, 1b, 1c and 1d, each modular unit is constituted by a body 2 having substantially a parallelepiped shape presenting on the transversal opposite faces the surface 11 which is raised according to surfaces 12a and 12b, the surface 21, the surface 22a and the 22b raised according to the 21, these surfaces allow the joint fixed connection between two modular units. The surface 13a has the holes 9a and 9c, similar holes (not shown in figure) are disposed on the surface 13b, the surface 60 has the holes 9b and 9d, whereas the surface 61 has the holes 9i and 9l, the holes 9b, 9d, 9i and 9l being passing. The holes 9a, 9b, 9c and 9d allow through the passing pins 10a, 10b, 10c and 10d, which are L-shaped to facilitate the grip, to fasten the joint fixed connection between two modular units. As shown in Fig. 1 and Fig. 2 at the terminal side parts of the system of
modular units the two terminal parts 5 and 6 are placed. The part 5 has the surfaces 45a, 45b and 46 which are countershaped according to surfaces 12a, 12b and 11; the part 6 has the surfaces 56a, 56b and 55 which are countershaped according to surfaces 22a, 22b and 21. The surface 46a has the holes 9e and 9f, similar holes (not shown in figure) are present on the surface 47b, the surface 57a has holes 9g and 9h, similar holes (not shown in figure) are on surface 57b, these holes are used to fix to the body 2 the terminal parts 5 and 6 through the suitable passing pins working as a connector. As shown in figures 7, 8, 9 the body 2 is longitudinally crossed by three channels having circular section 14, 15 and 16, wherein the channel 14 is the channel passed by the blow-by water for the cooling, the channel 15 passed by the still water and the channel 16 passed by the carbonated water, such channels outlenting on the opposite surfaces 11 and 21, on the surface 21 corresponding to said channels three annular grooves 34, 35 and 36 are carried out such that the same channels 14, 15 and 16 project out with a cylindrical portion, allowing in such a way the connection among the corresponding channels 14, 15 and 16 of two jointed modular units, the seal of the fluids passing through the channels and consequently through the modular units, is obtained through the O-rings 37a, 37b and 38. The outside feeding of the longitudinal channels 14, 15 and 16 is obtained through the transversal channels 17, 18 and 19, said channels outlenting on the rear surface 60, they are fed by external pipelines connected to the body 2 through the holes 52a and 52b. The channels 14, 15 and 16 of the units at the terminal side parts of the system have the terminal portions placed in contact outside respectively with the parts 5 and 6 closed through a suitable cap (not shown in figure), the same condition is for the feeding channels 17, 18 and 19 of the intermediate units 1b and 1c of the embodiment shown in Fig. 1 which are closed with suitable cap (not shown in figure). The channel 17 is constituted by two cylindrical portions 68 and 69 having circular section of different diameter, the channel 18 is constituted by two cylindrical portions 70 and 71 having circular section of different diameter and the channel 19 is constituted by two cylindrical portions 72 and 73 having circular section of different diameter, the portions having the larger diameter 68, 70 and 72 outlenting on the surface 60 and having the same length, the portions having the minor diameter 69, 71 and 73 outlenting on the corresponding longitudinal channels, the lenght of these second portions depends on the distance of the axis of the longitudinal channel from the surface 60. The longitudinal channels 15 and 16, as shown in Fig. 5, can feed through the vertical cylindrical channels 26 and 27 having circular section the mixing chamber 28. The inflow of the still water and of the
carbonated water into the mixing chamber 28 is controlled through the regulating means
23a and 23b and the nonreturn valves 24a and 24b. The nonreturn valves are constituted
by the spear valves 48a and 48b made in gummy resin, by the stems 49a and 49b and by
the springs 50a and 50b. The spear valves 48a and 48b are constituted by a cylindrical
drilled portion which houses a terminal part of the stems 49a and 49b, and by a
truncated-cone portion, the spear valves rest on the beating annular surfaces 30a and 30b
through the surfaces 29a and 29b having an overturned cone shape, they can move axially
inside the chambers 31a and 31b having a cylindrical shape with circular section. The
shape of the spear valves 48a and 48b allows that the possible presence of fluid in the
chambers 31a and 31b coming from the mixing chamber 28 squashes the same spear
valves on the surfaces 30a and 30b preventing the passage of the fluid from the chamber
28 to the vertical feeding channels 26 and 27. A portion of the stems 49a and 49b and
the springs 50a and 50b are housed inside the regulating means 23a and 23b. The means
23a and 23b have the annular grooves 62a and 62b inside which the O_rings 63a and 63b
are housed, such regulating means can move inside the chambers 32a and 32b, both the
regulating means and the chambers 32a and 32b have threaded surfaces (not shown in
figure) which allow the axial movement of the same elements. The chambers 32a and 32b
are carried out inside the cap 33 of the mixing chamber 28. The terminal portions of the
regulating means 23a and 23b facing the superior surface 41 of the body 2 have the
diametral grooves 64a and 64b using which it is possible to vary the axial position of the
same elements inside the chambers 32a and 32b; such movement causes the changing of
position of the spear valves 48a and 48b, the bigger is the displacement downwards of
the means 23a and 23b than it is minor the possibility of the spear valves to disjoin from
the supporting surfaces 30a and 30b, obviously the extreme condition is the closing of the
feeding channels 26 and 27 of the mixing chamber 28. The cap 33 of the mixing chamber
28 has a cylindrical shape and it is housed in the chamber 20, it has an almost circular
section and it is constrained to the body 2 through the screws 59a and 59b, in order to
allow the seal of the chamber 28 in the annular groove 43 of the cap 33 the O_ring 44
is inserted. The mixing chamber 28 is connected through the vertical channel 53 having
an elliptical section, to the transversal channel 54, such channel having a circular section
projects out from the body 2 with a cylindrical portion 74 housing the seats for possible
sealing O_rings for the connection with the outside dispensing devices. The body 2 is
transversally crossed by the channels 39 and 40 shown in Fig. 13 and 14, beverages come
to these channels, in particular the syrup arrives to channel 39, whereas to channel 40 a
syrup or a pre-mixed beverage can come. The channel 39 has a terminal portion 75 which comes out from the body 2 housing the seats for possible sealing O-rings for the connection with the outside dispensing devices. The channels 39 and 40 can be closed through the gate valves 65a and 65b constituted by the caps 76a and 76b and by the drilled cylindrical elements 77a and 77b made in gummy resin, connected to the caps 76a and 76b through a pivot (not shown in figure). The gate valves 65a and 65b move inside the chambers 67a and 67b, both the gate valves and the chambers have threaded surfaces (not shown in figure) such to allow the axial movement of the gate valves, the axial position is controlled using the diametral grooves 78a and 78b disposed at the superior terminal portion of the caps 76a and 76b, the axial movement of the gate valves 65a and 65b causes the opening or the closing of the transversal channels 39 and 40, the seal is obtained through the O-rings 66a and 66b carried by the caps 76a and 76b in the annular grooves 79a and 79b.

Each described modular unit can be used to supply a pre-mix tap, in such case the transversal channel 39 will be closed using the gate valve 65b and the transversal channel 54 using the regulating means 23a and 23b in order to close the vertical channels 26 and 27, it is furthermore inserted the adapter 7, shown in Fig. 15, constituted by a drilled plate 85 having a drilled truncated-cone portion 86 presenting the thread 87 in order to allow the connection with the rear threaded portion 25 of the tap 4.

The unit can as alternative be used to supply one or two taps for post-mix beverages, in the first case only the transversal channel 39 is fed and the transversal channel 40 is closed through the gate valve 65a, in the second case the transversal channels 32 and 40 are fed and the outlet of the channel 40 is modified through the adapter 8, shown in Fig. 16, constituted by two cylindrical portions 80 and 88, of which the portion 80 having a larger diameter is housed in the channel 40, and the portion 88 having minor diameter projects out from the body 2 in order to be connected to the dispensing front part, in Fig. 16 it is further shown a tap 89 suitable to the dispensing of two post-mix beverages.

It is possible to adapt the system to any dispensing front part combining opportunely the several units, being the system easy to change.

The single unit can be used for post-mix non carbonated beverages or for post-mix carbonated beverages with the possibility to regulate the dilution of the carbon dioxide inside the water using the regulating means 23a and 23b. As it is shown in Fig. 17 only the modular unit 1a, positioned at one terminal side part of the set of units, is
connected directly to the cooling apparatus for the supplying of still water, through the pipeline 81 and for the carbonated water through the pipeline 82, such modular unit 1a is further fed with blow-by water through the pipeline 83a, water which is carried back to the cooling coils through the pipeline 83b connected to the modular unit 1f placed at the other terminal side part of the set, the intermediate modular units 1b, 1c, 1d and 1e are fed with the still water, carbonated water and refrigerating water through the longitudinal channels 14, 15 e 16 which are connected between the modular adjacent units, whereas each unit is fed directly with the respective pre-mix or post-mix beverages through the channels 84a, 84b, 84c, 84d, 84e and 84f. In Fig. 17 it is schematically shown a dispensing front part constituted by five post-mix taps 3a, 3b, 3c, 3d and 3f and by the pre-mix tap 4, using the means 23a and 23b it is determined the opening or the closing of the longitudinal channels 15 and 16, as schematically shown in Fig. 18, the taps 3b, 3c and 3d being in such a way post-mix taps with still water, with carbonated water and with diluted carbonated water and the tap 4 being a pre-mix tap mounted directly on a modular unit in which the channels 15 and 16 have been closed. The same dispensing front part is shown in Fig. 19 wherein the elements 90 and 91 are the units obtained according to the state of art. The unit 90 supplies the post-mix taps 3a and 3b with still water coming from the pipeline 81, the unit 91 supplies the post-mix taps 3c, 3d and 3e with carbonated water coming from the pipeline 82, the cooling system is outside the units and the blow-up is obtained through the pipelines 83a and 83b, the beverages arrive to each tap coming from the pipelines 84a, 84b, 84c, 84d, 84e and 84f, the pre-mix tap 4 is mounted on a supporting member (not shown in figure) different from said units because it does not need dilution water.

The modular units carried out according to the present invention allow to mount the post-mix taps directly on the single units through the holes 58a, 58b, 58c and 58d without the necessity of inserting intermediate valve bases having the aim to allow the interruption of the inflow of still or carbonated water and of the syrup when the taps are dismounted, the presence of the regulating means 23a and 23b and of the gate valves 65a and 65b allow to the same unit to carry out such operation. In case of maintainance service it is possible to remove and substitute the single modular unit as shown in Fig. 1 and Fig. 1a without being forced to dismount the adjacent units, thanks to the simple connection system based upon the joint connection, which furthermore allows to prevent the use of possible intermediate joints increasing the sealing of the whole dispensing front part.
The so conceived invention is suitable to variations and changing all belonging
to the same inventive concept, furthermore all the details can be substituted with other
technically equivalent elements.
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CLAIMS

1. Modular manifold system for the distribution of pre-mix and post-mix beverages having as inlet the pipelines coming from the cooling system and carrying the beverages, the still water and carbonated water with which the post-mix beverages will be diluted, and the fluid used for the cooling of the system characterized by the fact of being constituted by at least two modular units connected to each other, being present inside each unit two transversal channels fit for being passed by the pre-mix beverages and by the syrups for the post-mix beverages, said channels being outside communicating in order to be connected to outside feeding and dispensing devices, each unit comprising three longitudinal channels fit for being passed by the still water, the carbonated water and the refrigerating fluid, said channels of adjacent units being communicating each other, each unit comprising three transversal channels outletting on said three longitudinal channels and outside communicating in order to be connected to outside feeding devices, each unit comprising regulating means which allow to choose which water, between still water and carbonated water, dilutes the syrup, allowing furthermore to regulate the inflow of the two types of water to a mixing chamber positioned inside the same unit and communicating outside through suitable channels, each unit further provided with gate valves which allow the opening and the closing of channels fit for being passed by the pre-mix beverages and by the syrups.

2. Modular manifold system according to claim 1° characterized by the fact that only the two units placed at the terminal side parts of the system are connected to said outside feeding devices of the still water, of carbonated water and the cooling fluid, whereas the intermediate units have said three transversal channels outletting on said three longitudinal channels closed through suitable cap elements.

3. Modular manifold system according to claim 1 characterized by the fact that the connection among adjacent units is obtained engaging the faying surfaces between the same units in order to result complementary (countershaped) obtaining in such a way an engaging coupling without intermediate joints, the connection is furthermore allowed by suitable fastening means.

4. Modular manifold system according to claim 3° characterized by the fact that said fastening means are constituted by passing pins working as connectors, said passing pins being L-shaped to facilitate the grip.

5. Modular manifold system according to claim 1° characterized by the fact that the channels fit for being passed by the pre-mix beverages and by the syrups are
orthogonal to the direction of the possible connection between adjacent units and they cross completely the unit according to such direction.

6. Modular manifold system according to claim 1° characterized by the fact that the channels fit for being passed by the pre-mix beverages and by the syrups in number of two are constituted by cylindrical portions having circular section.

7. Modular manifold system according to claim 1° characterized by the fact that the longitudinal channels fit for being passed by the carbonated water, still water and the blow-by water in number of three are constituted by cylindrical portions having a circular section.

8. Modular manifold system according to claim 1° characterized by the fact that the regulating means which allow to choose which water dilutes the syrup and to regulate the inflow of the two types of water in the mixing chamber operate nonreturn valves to which control means are connected said valves and control means are housed in cylindrical chambers inside which they can axially move.

9. Modular manifold system according to the claim 8° characterized by the fact that said control means are constituted by cylindrical parts facing an external surface of the unit presenting corresponding to such terminal part at least one groove through which it is possible to modify the axial position of said control means and of the corresponding nonreturn valves.

10. Modular manifold system according to claim 1° characterized by the fact that said gate valves are constituted by cylindrical parts facing outside the unit, they are housed inside cylindrical chambers carried out in the unit and in which the gate valves can move axially, said gate valves further presenting at least one groove on the surface facing outside through which it is possible to modify the position of the same in the cylindrical chamber.

11. Modular manifold system according to claim 1° and any of the previous claims characterized by the fact that a single unit can be used to feed indifferently only one post-mix tap with still water or only one post-mix tap with carbonated water or only one pre-mix tap or to feed two post-mix taps with still water or two post-mix taps with carbonated water, all that being possible suitable positioning said gate valves and said regulating means.

12. Modular manifold system according to claim 1° and any of the previous claims characterized by the fact that the dispensing taps are directly connected to the unit having said gate valves and said regulating means the aim of interrupting the inflow of
water and/or beverages to the taps in case they are dismounted or are since a long time in non-use condition.

13. Modular manifold system according to claim 1° and any of the previous claims characterized by the fact that the system is independent from the shape of the dispensing front part to supply.

14. Modular manifold system according to claim 1° and any of the previous claims characterized by the fact that it is possible to remove from the system for the maintainance only one intermediate unit without operating on the adjacent units.
A. CLASSIFICATION OF SUBJECT MATTER

IPC 6 B67D1/08

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

B. FIELDS SEARCHED

Minimum documents searched (classification system followed by classification symbols)

IPC 6 B67D

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)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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| P, X     | EP 0 837 029 A (CELLI S.P.A.)  
22 April 1998  
see column 3, line 18 - column 4, line 37;  
figures  
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| A        | US 3 347 421 A (YINGST) 17 October 1967  
see claim 4; figures 3, 4  
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| A        | US 5 685 458 A (DURHAM ET AL.)  
11 November 1997  
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Date of the actual completion of the international search

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