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Booth et al.

[11] **3,809,292**

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[54] **STADIUM FILLER**

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[52] **U.S. Cl.**..... **222/146 C,** 261/DIG. 7, 222/129.1, 137/340

[51] **Int. Cl.**..... **B67d 5/62**

[58] **Field of Search**..... 222/129.1, 146 C, 318, 222/129; 417/308, 307; 137/339, 340; 261/DIG. 7, 151, 140, 70

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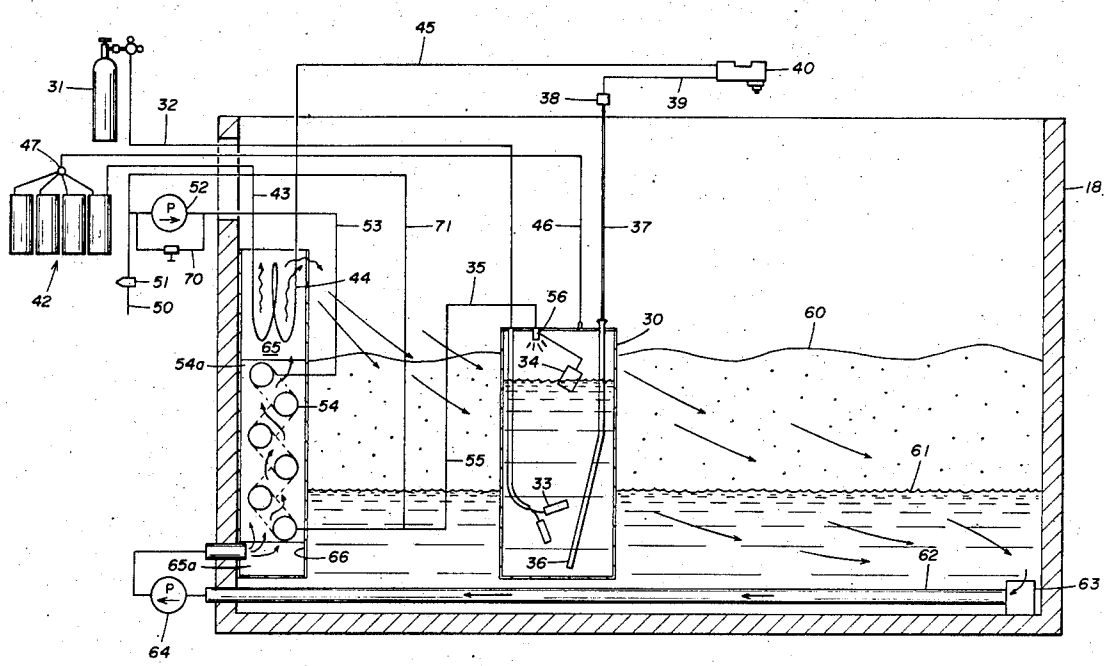
[57] **ABSTRACT**

A high volume stadium type filler for delivering substantially uniform chilled carbonated beverages at high volume wherein an ice chest is provided with a carbonator tank therein, a drain in the bottom near one end thereof leading through a pump and a baffled chamber extending the height of and in the other end thereof with water cooling coils in the chamber leading from a pressurized source to the carbonator with means for delivering water from the bottom of said carbonator to a dispensing valve simultaneously with syrup, both under CO_2 gas pressure.

9 Claims, 2 Drawing Figures



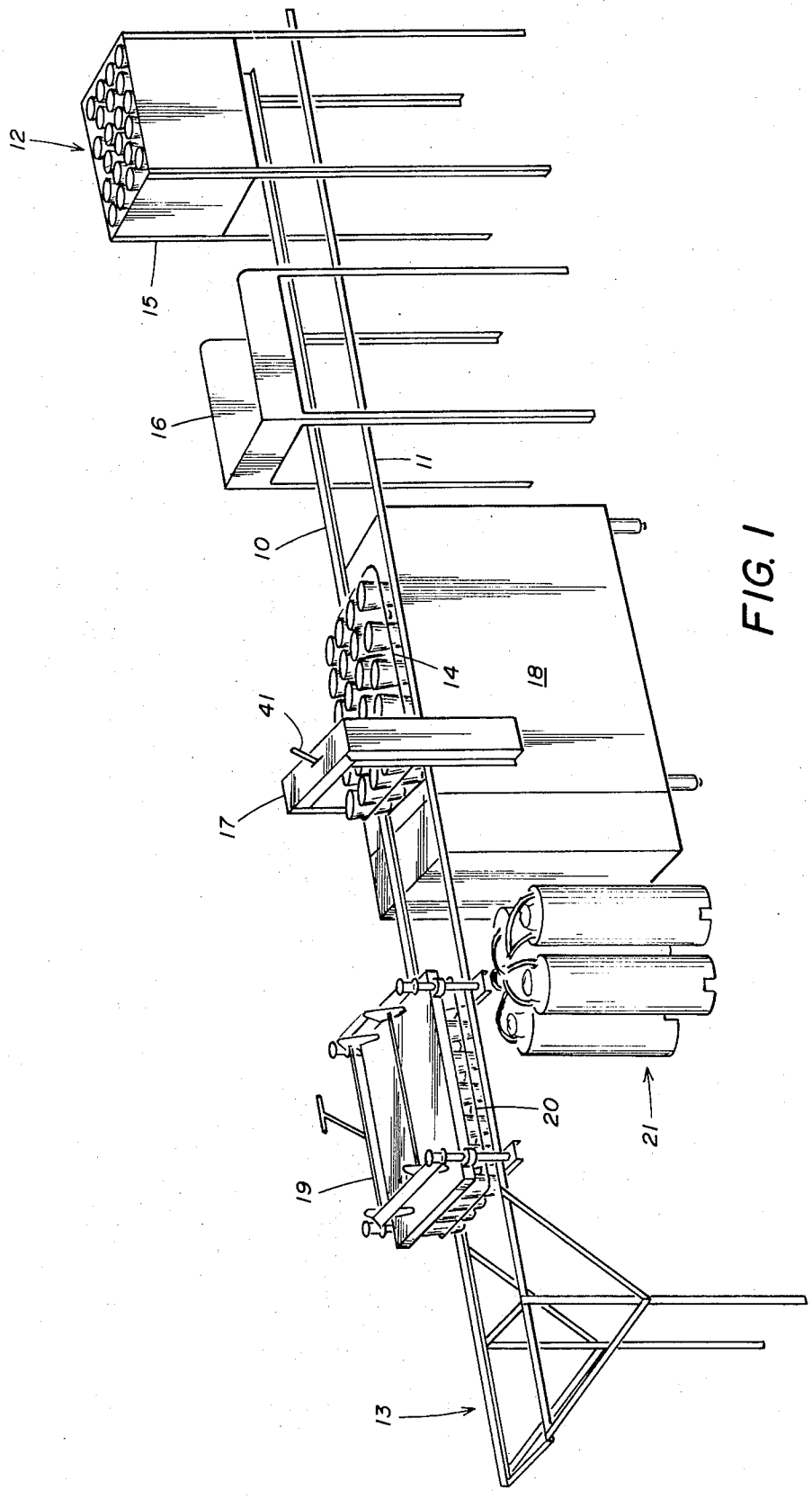


FIG. 1

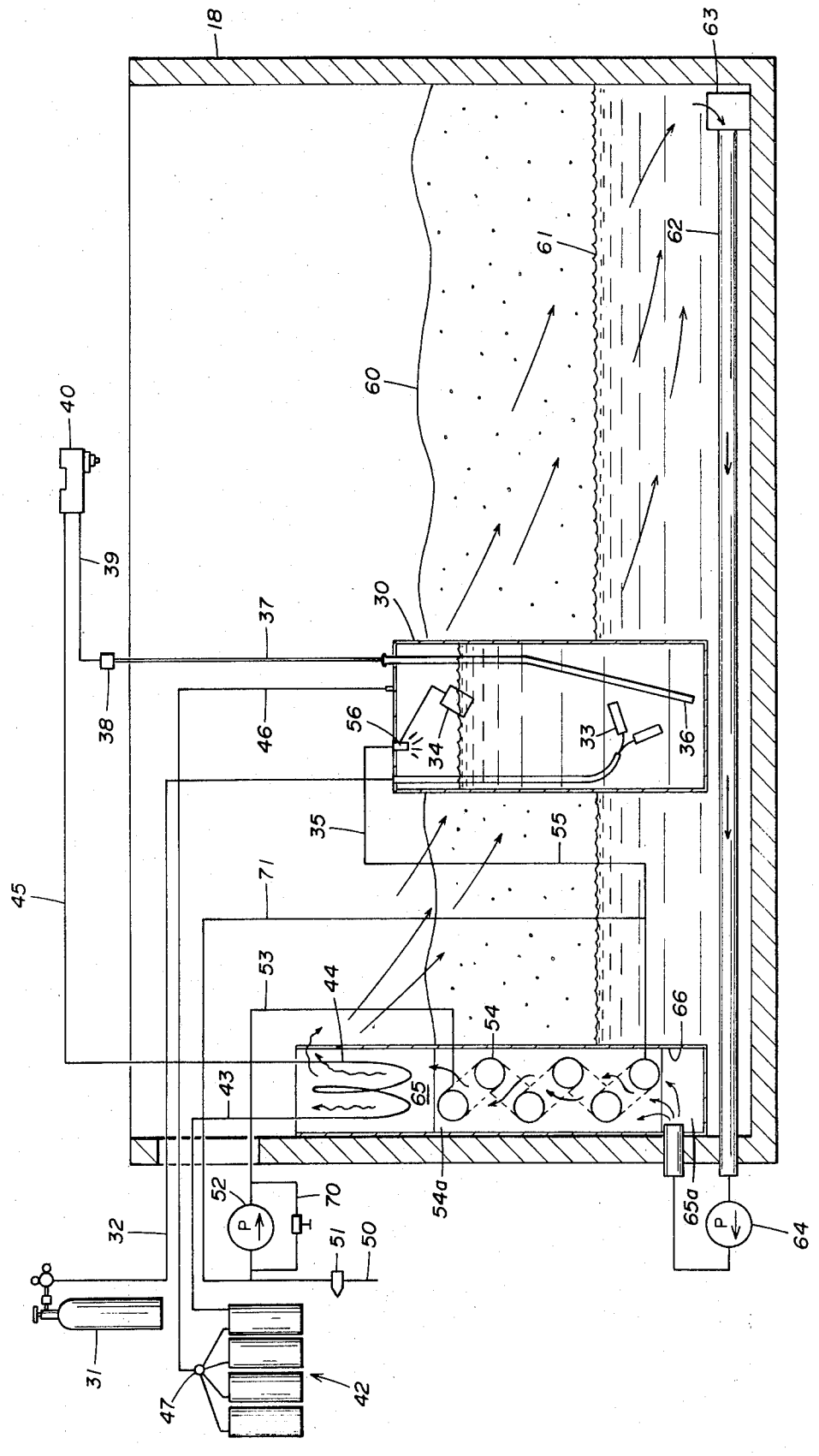

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FIG. 2

STADIUM FILLER

SUMMARY OF THE INVENTION

This invention relates to a system for delivering chilled carbonated beverages in multiple streams and/or at high volume to permit dispensing in individual containers to large crowds. In a more specific aspect, the invention relates to a stadium type of cup filler with a cool reservoir (ice or electric) adapted to maintain a carbonator and the effluent therefrom chilled even though the flow of water thereto is at a high temperature and the throughput is at a high volume.

Delivering of high volumes of carbonated beverages in short periods of time as at sporting events and the like can readily be accommodated by the installation of large capacity refrigeration systems. However, the economics involved in such operation have forced concessionaires to less sophisticated systems and primarily to those systems in which the latent heat involved in an ice bank is employed.

In prior art systems, large cooling coils have been installed in the bottom of an ice chest and covered with an ice bank. Makeup water to a carbonator drawn through the cooling coils is thus to be chilled. Bridging of ice in the ice bank at the bottom portion thereof has been found to be such that the lake of water which forms as the makeup water courses through the coil rapidly increases in temperature, resulting in the delivery of an inferior product. The present invention is directed to a system which overcomes the foregoing problems and, with minimum equipment, assures high volume delivery of a substantially uniform chilled carbonated beverage.

More particularly, in accordance with a preferred embodiment of the present invention there is provided a combination of an ice chest that has a baffled chamber in one end in which cooling coils are located. A carbonator located within the chest is connected by water makeup lines to the cooling coil. A pipe in the bottom of the chest at the end thereof opposite the baffled zone is connected by way of a pump for delivering ice water from the intake pipe to the bottom of the baffled zone. A crushed ice bank placed in the chest is then continuously worked by the flow of water out of the baffled zone while coursing the length of the chest towards the pipe in order to maintain substantially uniform the temperature of the water flowing over the cooling coils.

BRIEF DESCRIPTION OF THE DRAWINGS

For a more complete understanding of the present invention and for further objects and advantages thereof, reference may now be had to the following description taken in conjunction with the accompanying drawings in which:

FIG. 1 is a view illustrating a high volume dispensing system which embodies the present invention; and

FIG. 2 is a drawing illustrating the carbonator filler arrangement of FIG. 1.

DESCRIPTION OF A PREFERRED EMBODIMENT

FIG. 1 illustrates a high volume system for dispensing post mixed carbonated beverages employing the present invention. A pair of rails **10** and **11** extend from a cup dropping station **12** to an output station **13.** A mesh wire rack **14** is adapted to be placed on the rails

10 and **11** and passed beneath a cup dropper **15** wherein a plurality of cups simultaneously are deposited in the rack **14** in a **4 × 6** array. Twenty-four cups are simultaneously placed there.

Rack **14** is then moved forward to a location beneath a cup icer unit **16** wherein each of the cups is filled with crushed ice. The rack is then moved to the position shown in FIG. **1** wherein each transverse row of cups, four cups at a time, pass beneath four spouts depending from an overhead unit **17** which is positioned above and is a part of a filler unit **18.**

The cups are then filled and then moved to a cup capping unit **19** wherein the twenty-four cups in a rack **20** simultaneously are capped. Thereafter, rack **20** is moved to the output station **13** as rack **14** is moved under the capper **19.**

A plurality of syrup tanks **21** are provided adjacent to the carbonator **18** to store syrup for chilled carbonated water provided in the filler unit **18.** A source of water and a source of carbon dioxide (not shown) are provided so that the conventional carbonated beverages are supplied to the cups in the racks.

The problem to which the present invention is directed is to provide a filler unit having a carbonator which has such high capacity and yet remains relatively simple in its construction, as to permit a high throughput. In satisfying the demand at sporting events, such as football games, baseball games, and the like, a high demand over a short period of time is imposed upon concessionaires. The present invention is directed specifically to that type of operation and employs the structure shown in FIG. **2** satisfactorily to meet such demand.

More particularly, in FIG. **2** filler unit **18** is illustrated as comprising an open topped ice chest containing therein a carbonator **30.** CO_2 gas from a tank **31** is supplied to the carbonator by way of line **32.** The carbonator tank may be generally of the type illustrated in U.S. Pat. No. 3,472,425 whereby the carbonated gas is bubbled through blocks **33** in the bottom of the carbonator tank **30.** A float **34** serves to control a valve from a water makeup line **35** to maintain the liquid level in the carbonator tank **30** between predetermined limits.

Chilled carbonated water travels by way of a tube **36** which extends to the bottom of the tank **30,** and line **37** to a manifold **38.**

An output line **39** from the manifold **38** leads to a dispensing valve **40.** In the system shown in FIG. **1,** four lines such as line **39** lead to four valves such as valve **40** all actuated simultaneously by a single lever **41,** FIG. **1.**

Syrup from syrup tanks **42** is forced through a line **43,** a cooling coil **44** and a line **45** to the valve **40** wherein the syrup is mixed with the carbonated water in the desired proportions. Drive energy for the syrup is supplied by way of a CO_2 purge line **46** leading from the top of the carbonator tank **30** to a manifold **47** which is connected to the syrup tanks **42.**

Water is supplied to the system by way of a line **50** which passes through a pressure regulator **51** to pump **52.** Pump **52** forces the makeup water through line **53** and cooling coil **54** and then by way of line **55** to a spray float controlled valve **56** in the lid of the carbonator **30.** Regulator **51** normally is set at about 20 p.s.i. and regulator **31a** on CO_2 tank **31** is set at about 55 p.s.i.

The problem involved in maintaining the capability of delivering high volumes of substantially uniformly chilled carbonated beverages is met by the present invention by employing a large volume chest for filler **18** in which a large ice bank **60** may be provided. Initially in a given operation ice bank **60** may completely cover the carbonator and extend nearly to the top of the filler **18.**

As the ice melts, a pool **61** of water accumulates in the bottom of the filler **18.** In accordance with the present invention, an intake pipe **62** leads from a filter **63** to a pump **64.** Pump **64** picks up water from the bottom of the tank in the lower right-hand corner thereof. Filter **63** prevents the circulation of ice particles and limits the flow through the pipe **62** to water. The inlet of pump **64** is connected to pipe **62.** The outlet of pump **64** is connected to the bottom of a chamber **65** formed in the left end of filler **18** by a baffle **66.** A coil **54** through which the water passes is confined within the chamber **65.** The water at about 32° picked up at the bottom of the filler **18** passes from the bottom of the chamber **65** to the top passing over the water cooling coil **54** and the syrup cooling coil **44.** The water then spills out of the top of the chamber **65.** Note that the baffle **65** is positioned in the end of the chest **18** opposite the filter **63.** By this means, the cold storage represented by the ice bank may be fully utilized for maintaining 32° water constantly flowing into the cooling chamber **65.** This system avoids bridging of the ice in filler **18** by maintaining the flow of water the length of the chest **18** after it spills over the baffle **66.** Thus, by controlling the movement of the cooling water through the filler **18,** a more efficient operation of the carbonator is assured.

It has been found that the arrangement herein provided, limiting the flow as shown in FIG. **2,** permits the delivery of chilled beverages from the valve **40** on the average of 10° to 12° colder than normally is delivered through contemporary systems which do not include the cooling provisions as above described.

It will be noted that the pump **52** for makeup water is provided with a bypass channel. The line **71** is provided from line **35** to the input to the pump **52** so that when the valve **56** is closed, a small stream of water will continuously be circulated through the loop which includes line **71** to prevent pump **52** from overheating. The pump bypass **70** eliminates the need for any pressure switches in the system and permits the pump **52** to be operated continuously even though water is not being withdrawn from the system.

By way of example, in operation of one embodiment of the system, the regulator **51** was set at 20 p.s.i. pressure. The CO_2 gas source was regulated at about 55 p.s.i. The valve **56** in carbonator **30** was set to close and hold off flow from pump **52** at about 170 p.s.i. The pump bypass in loop **70** was set to open at about 150 p.s.i. By this means, it is assured that the water pressure from pump **52** would not override float **34** as it closes valve **56** thereby avoiding flooding the carbonator **30.** The capillary bypass line **71** leading from the outlet point of the coil **54** assures a continued flow of chilled water into the pump sufficient to prevent the pump from heating.

Thus, in accordance with the invention, an ice chest is provided having a drain pipe with a pickup zone therefor at the bottom of the chest and in one end thereof with structure forming a chamber in the opposite end extending substantially the height of the chest. A circulating pump is connected at its input to the drain pipe for delivering water from the bottom of the chest into the bottom of the chamber. A water cooling coil is located within the chamber over which the chilled water from the circulating pump flows. A carbonator tank is connected to the outlet of the cooling coil for receiving and carbonating chilled water from the cooling coil. A mixing-dispensing valve connected to the carbonator controls the flow of chilled water from the carbonator. A syrup tank connection leads to the valve for delivering syrup thereto for mixture with water from the carbonator. A pressurized source of carbon dioxide gas is flow connected to deliver gas to the bottom of the carbonator and thence from the top of the carbonator to the top of the syrup tank to provide a drive force on both the water in the carbonator tank and syrup in the syrup tank while carbonating water in the carbonator tank.

In preferred form, the cooling coils **54** are arranged in downwardly arrayed horizontally extending sections or loops, all contained within a set of vertical baffles **54***a*. The baffles are parallel vertical plates to require laminar flow of water over coils **54** greatly to increase the efficiency of the system. Ascending chilled water from plenum chamber **65***a* below the baffles **54***a* is uniformly distributed to all parts of the cooling coil **54** as it flows upward through a tortuous restrictive path over the coils.

Having described the invention in connection with the embodiment illustrated in FIG. **2,** it is to be understood that further modifications thereof may now appear to those skilled in the art and it is intended to cover such modifications as fall within the scope of the appended claims.

What is claimed is:

1. A high volume filler for providing chilled carbonated beverage which comprises:
- an ice chest with a drain pipe having an inlet at the bottom and in one end of said chest,
- a chamber extending substantially the height of the chest located in the opposite end from said inlet,
- a pump connected at its input to said drain pipe for delivering water from the bottom of said chest into the bottom of said chamber,
- a water cooling coil located within said chamber over which water from said pump courses,
- a carbonator connected to the outlet of said cooling coil,
- at least one dispensing valve connected to said carbonator for securing chilled carbonated water therefrom,
- a syrup tank connection leading to said valve for delivering syrup thereto, and
- a pressurized source of carbon dioxide gas connected to deliver gas to said carbonator.

2. The combination set forth in claim **1** wherein the syrup tank connection includes a coil located in said chamber for cooling syrup flowing to said valve.

3. The combination of claim **1** wherein said pressurized source includes means for regulating gas pressure at a pressure below the pressure in said water cooling coil and wherein control means is provided automatically to stop flow of water to said carbonator at pressure below that developed in said cooling coil but above the regulated gas pressure.

4. The combination set forth in claim 1 wherein at least one syrup supply tank is connected in parallel to receive CO_2 pressure from the top of said carbonator tank with a connection to purge said carbonator by flow of gas from said carbonator to said syrup tank.

5. The combination set forth in claim 1 wherein said water cooling coils are arranged in downwardly progressing horizontally extending loops contained within a vertical baffle so that ascending cold water within said chamber is uniformly distributed to all parts of said water cooling coil.

6. The combination set forth in claim 1 wherein multiple dispensing valves are coupled to a common mechanical linkage for multiple valve operation simultaneously to dispense carbonated beverages in multiple controlled streams.

7. A high volume dispenser for providing chilled carbonated beverage which comprises:

an ice chest having a drain pipe with the pickup zone at the bottom and located at one end of said chest,

structure forming a chamber in the opposite end of said chest from said pickup zone extending substantially the height of the chest,

a pump connected at its input to said drain for delivering water from the bottom of said chest into the bottom of said chamber,

a water cooling coil located within said chamber over which water from said pump flows,

a carbonator tank connected to the outlet of said cooling coil for receiving and carbonating chilled water from said coil,

a mixing-dispensing valve connected to said carbonator for control of flow of chilled water from said carbonator,

a syrup tank connection leading to said valve for delivering syrup thereto for mixing with water from said carbonator, and

a pressurized source of carbon dioxide gas flow connected to deliver gas to the bottom of said carbonator and thence from the top of said carbonator to the top of said syrup tank to provide a drive force for both the water in said carbonator tank and syrup in said syrup tank while carbonating water in said carbonator tank.

8. A high volume filler for providing chilled carbonated beverage which comprises:

an ice chest having a drain at the bottom and in one end thereof,

a chamber extending substantially the height of the chest located in the opposite end from said drain,

a first pump connected at its input to said drain for delivering water from the bottom of said tank into the bottom of said chamber,

a second pump,

a water cooling coil connected to the output of said second pump and located within said chamber in the flow of water from said first pump,

a carbonator connected to the outlet of said cooling coil,

a dispensing valve connected to said carbonator for control of chilled water therefrom,

a syrup tank connection leading to said valve for delivering syrup thereto for mixing with water from said carbonator,

a pressurized source of carbon dioxide gas connected to deliver gas to the bottom of said carbonator and thence from the top of said carbonator to the top of said syrup tank, and

bypass means around said second pump operating at a pressure higher than the operating pressure in said carbonator and including at least one flow path connecting said outlet of said cooling coil to the inlet to said second pump.

9. A high volume filler for providing chilled carbonated water which comprises:

an ice chest with a drain pipe having an inlet at the bottom and in one end of said chest,

a chamber extending substantially the height of the chest located in the opposite end from said inlet,

a pump connected at its input to said drain pipe for delivering water from the bottom of said chest into the bottom of said chamber,

a water cooling coil located within said chamber over which water from said pump courses,

a carbonator connected to the outlet of said cooling coil,

at least one dispensing valve connected to said carbonator for directing flow of chilled carbonated water therefrom, and

a pressurized source of carbon dioxide gas connected to deliver gas to said carbonator.

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