MIXED DRINK PREPARATION APPARATUS

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ABSTRACT
A mixed drink preparation apparatus includes a housing having a liquor receiving zone which receives a plurality of quantities of liquor each in its original container. The housing also receives mix containers, a water container, and a carbon dioxide container. A dispensing head is mounted on the housing and extends into a mixed drink preparation zone. A drain extends from a point in the mixed drink preparation zone beneath the dispensing head to a drain container mounted in the housing. Liquor pumps function to withdraw liquor from the liquor containers and to discharge the liquor through the dispensing head. The mix containers are pressurized with carbon dioxide gas from the carbon dioxide container, whereby mix is caused to flow through the dispensing head. A water pump withdraws water from the water container and directs the water through a liquid chilling apparatus and through the dispensing head. The water pump also directs water into a carbonating apparatus which supplies carbonated water. The flow of the various liquids through the dispensing head is regulated by valves which are in turn controlled by electronic circuitry. The electronic circuitry responds to cards each individual to a particular mixed drink to actuate the valves to effect discharge of the proper amount of each liquid necessary for the preparation of the desired mixed drink through the dispensing head. The electronic circuitry may also include counters which serve to record the quantity of liquor dispensed.

12 Claims, 13 Drawing Figures
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MIXED DRINK PREPARATION APPARATUS

BACKGROUND AND SUMMARY OF THE INVENTION

This invention relates to a mixed drink preparation apparatus, and more particularly to a card controlled system for automatically preparing a wide variety of mixed drinks.

It is now well established that the manual preparation of mixed drinks inherently involves a number of substantial problems. For example, at a cocktail party or reception, a number of bar locations and a equal or greater number of bartenders may be required in order to provide mixed drinks for quests. Notwithstanding the large inventory and labor costs which are involved in such an operation, there are often long lines at each bar location, leading to irritation of the guests and disruption of the affair. This is true because the manual preparation of a mixed drink involves a number of time consuming steps, such as selection of the proper liquor, pouring of the liquor, selection of one or more mixes, pouring of the mixes, etc.

Another problem involved in the manual preparation of mixed drinks is that of accountability. Depending on the particular bartender that is preparing the mixed drink, the amount of liquor that is actually used in preparing the mixed drink may vary to a considerable extent. When this factor is combined with such factors as spillage, breakage, and the task of properly accounting for the liquor used in a manual mixed drink preparation operation, the problem becomes quite substantial.

The foregoing problems have been at least partially recognized heretofore. For example, Application Ser. No. 322,120 filed Jan. 8, 1973, by Craig for BEVERAGE DISPENSING APPARATUS discloses an apparatus for automatically dispensing mixed drinks which operated under the control of punched cards. However, experience with the prior device has revealed a number of difficulties. For example, in the use thereof, liquors must be poured from their original containers into liquor receiving containers which are then pressurized to effect liquor dispensing. This procedure has been found to be time consuming and is also liable to spillage, breakage, etc. Additionally, the prior device does not provide for accountability of liquors used. The ability to maintain accurate records with respect to liquor usage is considered to be highly advantageous in any type of automated mixed drink preparation system. Thus, a need exists for still further improvements in the art of automatic mixed drink preparation.

The present invention comprises a mixed drink preparation system which overcomes the foregoing and other disadvantages long since associated with the prior art. Thus, by means of the present invention, mixed drinks are prepared very rapidly, i.e., within 6 seconds or less per drink, and with little or no possibility of spillage or breakage. Also, mixed drink preparation systems incorporating the invention provide for full accountability of all liquors used.

In accordance with the broader aspects of the invention, a mixed drink preparation apparatus includes a housing which received a plurality of quantities of liquor, each in its original container, a plurality of quantities of mixes, a quantity of water, and a quantity of carbon dioxide. The housing includes a top wall defining a mixed drink preparation zone, and a dispensing head is mounted on the housing and extends into the mixed drink preparation zone. A plurality of cards are provided, with each card corresponding to a particular mixed drink. Upon insertion of a card, the various liquids necessary in the preparation of a mixed drink corresponding to the card are pumped from their various containers and the precise quantity of each liquid that is necessary in the preparation of a desired mixed drink is discharged through the dispensing head.

In accordance with more specific aspects of the present invention, liquor is withdrawn from the liquor containers and is discharged through the dispensing head by a plurality of liquor pumps individual to one of the liquors. In the preferred embodiment, gas-operated liquor pumps are employed, and solenoid-actuated valves are utilized to regulate the amount of liquor dispense. The mix containers are charged with pressurized carbon dioxide gas from the carbon dioxide container, whereby the mixes flow through the dispensing head under the action of the pressurized carbon dioxide gas. Solenoid-actuated valves are utilized to regulate the amount of mix dispensed.

A mechanical refrigeration apparatus defining a liquid chilling apparatus is mounted within the housing. Water is withdrawn from the water container by a motor-driven water pump and is directed through the liquid chilling apparatus and through the dispensing head, with the quantity of water dispensed being regulated by a solenoid-actuated valve. Water is also directed from the water pump to a carbonating apparatus which receives carbon dioxide gas from the carbon dioxide container and functions to form carbonated water. Carbonated water from the carbonating apparatus is directed through the liquid chilling apparatus and through the dispensing head, with the quantity of carbonated water discharged being regulated by a solenoid-actuated valve.

The operation of the mixed drink preparation apparatus is under the control of electronic circuitry. Each of the cards carries indicia representative of both the various liquors required in the preparation of and the quantity of each liquid required in the preparation of the corresponding mixed drink. Upon insertion of a particular card, the electronic circuitry responds to the indicia thereon to activate the corresponding solenoid-actuated valves for predetermined periods of time, thereby effecting discharge of the required quantity of each of the liquors which is utilized in forming the particular mixed drink.

DESCRIPTION OF THE DRAWINGS

A more complete understanding of the invention may be had by reference to the following Detailed Description when taken in conjunction with the accompanying Drawings, wherein:

FIG. 1 is an illustration of a mixed drink preparation apparatus incorporating the invention;
FIG. 2 is an illustration of a typical card utilized in controlling the operation of the mixed drink preparation apparatus of FIG. 1:
FIG. 3 is an illustration of a portion of the interior of the mixed drink preparation apparatus;
FIG. 4 is an illustration of another portion of the interior of the mixed drink preparation apparatus;
FIG. 5 is an illustration of the dispensing head of the mixed drink preparation apparatus;
FIG. 6 is a sectional view of the dispensing head;
FIG. 7 is an illustration of the system utilized in the mixed drink preparation apparatus for controlling the flow of liquids through the dispensing head.

FIG. 8 is an illustration of the liquor pumping system of the mixed drink preparation apparatus.

FIG. 9 is an illustration of the syrup pumping system.

FIG. 10 is an illustration of the sweet and sour mix pumping system.

FIG. 11 is an illustration of a combined water pumping, carbonated water making, and carbonated water pumping system utilized in the mixed drink preparation apparatus.

FIG. 12 is a schematic illustration of the electronic circuitry of the mixed drink preparation apparatus.

FIG. 13 is a schematic illustration of the counter circuitry of the mixed drink preparation apparatus.

DETAILED DESCRIPTION

Referring now to the Drawings, and particularly to FIG. 1 thereof, there is shown a mixed drink preparation apparatus 20 incorporating the present invention.

The apparatus 20 includes a housing 22 which is supported on casters 24 for portability. The housing 22 may be formed from wood, metal, or the like, and includes a front wall 26, a back wall 28, and opposed side walls 30. The front wall 26, the back wall 28, and the side walls 30 extend upwardly from a bottom wall 32 to a top wall 34, and the front wall 26 and the side walls 30 extend upwardly beyond the top wall 34 for cooperation therewith to define a mixed drink preparation zone 36. An extension of the back wall 28 in hingedly supported to provide a serving shelf 38. The housing 22 further includes a cover 40 which is hingedly secured to the front wall 26 and is adapted to be supported in the raised position illustrated in FIG. 1 by a conventional brace 42.

A dispensing head 44 is supported on the housing 22 and extends into the mixed drink preparation zone 36 from the front wall 26. The dispensing head 44 is positioned directly over a sink 46. Also accessible from the mixed drink preparation zone 36 is an ice bucket 48 having a cover 50 and a blender 52 including a base 54 secured in the top wall 34. It will be understood that the use of the ice bucket 48 and/or the use of the blender 52 in the mixed drink preparation apparatus 20 is entirely optional.

A blender control/counter assembly 56 is mounted at the intersection of the front wall 26 and the top wall 34 for access from the mixed drink preparation zone 36. A card reader slot is provided at 57. A plurality of cards each corresponding to a particular mixed drink are normally stored in a rack 58 mounted on the cover 40. Upon insertion of a selected card into the card reader slot 57, the mixed drink preparation apparatus 20 functions automatically to prepare the mixed drink corresponding to the selected card. This is accomplished by discharging precisely measured quantities of each of the various liquids necessary in preparing the mixed drink through the dispensing head 44. As the mixed drink preparation apparatus 20 is utilized in preparing mixed drinks, the quantities of liquor dispensed are recorded by the counter portion of the blender control/counter assembly 56. This is advantageous both in maintaining inventory control and in preventing pilferage from the mixed drink preparation apparatus 20.

The back wall 28 of the housing 22 of the mixed drink preparation apparatus 20 comprises two sets of hingedly supported doors 60 and 62. As is best shown in FIG. 4, the doors 62 enclose a liquor receiving zone 64. A plurality of liquor containers 66 are received in the liquor receiving zone 64 by means of a rack 68 which is slidably supported on the bottom wall 32 of the housing 22. In accordance with one highly advantageous feature of the invention, the liquor containers 66 comprise the original containers for the various liquors which are utilized in the operation of the mixed drink preparation apparatus 20.

The liquor receiving zone 64 also encloses a plurality of liquor pumps 70. The liquor containers 66 are each connected to one of the liquor pumps by a conduit 72. In those instances in which two of the containers 66 contain identical liquors, a three-way valve 74 is employed to connect both the containers 56 to the same pump 70.

The doors 62 of the back wall 28 of the housing 22 also enclose a container 76 filled with carbon dioxide and comprising a carbon dioxide receiving zone 78. A sweet and sour mix container 80 is mounted adjacent to the carbon dioxide container 76. A drain container 82 is mounted on one of the doors 62 and is connected to an outlet in the bottom of the sink 46 by a conduit 84.

A lamp 86 is mounted on the underside of the top wall 34 for illuminating the interior of the liquor receiving zone 64. The ice bucket 48 projects downwardly through the top wall 34 and extends into the liquor receiving zone 64. The mixed drink preparation apparatus 20 may be equipped with a timer 88 adapted to prevent operation of the apparatus 20 during certain hours of each day.

Referring now to FIG. 3, the doors 60 of the back wall 28 of the housing 22 enclose a water container 90 defining a water receiving zone 92. The outlet of the container 90 is directed to a motor-driven water pump 94. An electrically driven combined refrigeration and carbonated water making apparatus 96 is mounted in the lower portion of the portion of the housing 22 enclosed by the doors 60. A plurality of mix containers 98 are mounted in a rack 100 supported on the bottom wall 32 of the housing 22. Also, two mix containers 98 are mounted on one of the doors 60. The mix containers 98 define a mix receiving zone 102 and may be employed in tandem, that is, with pairs of containers 98 having the same mix therein. A lamp 104 is secured to the underside of the top wall 34 for illuminating the portion of the housing enclosed by the doors 60.

The dispensing head 44 of the mixed drink preparation apparatus 20 is illustrated in FIGS. 5 and 6. The dispensing head 44 comprises a plurality of individual conduits which are received and retained by a ring 106. As is best shown in FIG. 6, the conduits each terminate flush with the bottom of the ring 106.

Referring now to FIG. 7, water is received in the dispensing head 44 through a conduit 116. A solenoid-actuated valve 118 is provided in the conduit 114 for precisely regulating the quantity of water that is dispensed through the dispensing head 44. Carbonated water is received in the dispensing head 44 through a conduit 120. A solenoid-actuated valve 122 is provided in the conduit 120 for precisely regulating the quantity of carbonated water that is dispensed through the dispensing head 44. Mixes are received through the dispensing head 44 through a series of conduits 124. Each conduit 124 is provided with a solenoid-actuated valve 126.
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and the valves 126 function to precisely regulate the quantity of each mix that is discharged through the dispensing head 44. Liquors are received in the dispensing head 44 through a plurality of conduits 128. Each conduit 128 is provided with a solenoid-actuated valve 130. The valves 130 function to precisely control the quantity of each liquor that is dispensed through the dispensing head 44.

In FIG. 8 there is shown a system 131 for pumping liquor from the containers 66 through the dispensing head 44 under the control of the solenoid-actuated valve 130. A cylinder 132 has a piston 134 slidably received therein. The piston 134 is normally positioned as shown in FIG. 8 under the action of a spring 136. Liquor is received in the cylinder 132 from one of the containers 66 through one of the conduits 72 and possibly one of the three-way valves 74. A check-valve 138 at the end of the conduit 72 prevents backflow of liquor from the cylinder 132.

A solenoid-actuated valve 140 normally maintains the rod end of a cylinder 132 at atmospheric pressure through an exhaust port 142. Whatever it is desired to pump liquor, the valve 140 is operated to close the exhaust port 142 and to simultaneously admit pressurized carbon dioxide gas from the container 76 into the rod end of the cylinder 132 through a passageway 144. The action of the pressurized carbon dioxide gas drives the piston 134 toward the top of the cylinder 132, thereby pumping liquid through the conduit 128, through the solenoid-actuated valve 130, and through the dispensing head 44. The precise quantity of liquor that is discharged through the dispensing head 44 is regulated by the solenoid-actuated valve 130.

Following the pumping operation, the solenoid-actuated valve 140 is operated to close the passageway 144 and to return the rod end of the cylinder 132 to atmospheric pressure through the exhaust port 142. The spring 136 then returns the piston 134 to the position shown. This action draws liquor from the container 66 into the interior of the cylinder 132. A check-valve 146 prevents backflow of liquor from the conduit 128.

A mix pumping system 148 utilizes the mixed drink preparation apparatus 20 is illustrated in FIG. 9. Pressurized carbon dioxide gas is received in each mix container 98 from the container 76 thereof to a passageway 150. One of the conduits 124 extends from the interior of the mix container 98 through one of the solenoid-actuated valves 126 to the dispensing head 44. Thus, mix is discharged from the container 98 through the dispensing head 44 under the action of the pressurized carbon dioxide gas from the container 76, and under the control of the associated solenoid-actuated valve 126.

A sweet and sour pumping system 152 is illustrated in Fig. 10. Pressurized carbon dioxide gas is received from the container 76 thereof through a conduit 154 under a pressure determined by the setting of a pressure regulator 156. One of the conduits 122 extends from the interior of the container 80 through one of the solenoid-actuated valves 124. Thus, sweet and sour mix is discharged from the container 80 through the dispensing head 44 under the pressure of carbon dioxide gas received from the container 76, and under the control of the associated solenoid-operated valve 124.

Referring to FIG. 11, there is shown a combined water-pumping, carbonated water making and carbonated water-pumping system 158 for the mixed drink preparation apparatus 20. The combined refrigeration and carbonated water making apparatus 96 includes a housing 160 having an electric motor 164 mounted therein. The electric motor 162 drives a fan 164 and a compressor 166. The compressor 166 directs high pressure working fluid to a condenser 168 and to an expansion valve 170 which in turn directs low pressure, substantially chilled working fluid to a coil 172 extending through a thermally insulated portion of the housing 160. The outlet of the coil 172 is returned to the compressor 166.

Water is withdrawn from the container 90 thereof by the pump 94 through a conduit 174 extending to the interior of the container 90, and is directed through a conduit 176 to a coil 178 mounted within the coil 172. Thus, water flowing through the coil 178 is substantially chilled under the action of the low temperature working fluid in the coil 172. From the coil 178, the chilled water flows through a conduit 180 to a T-fitting 182. A portion of the water passes from the T-fitting 182 through a pressure regulator 184 to the conduit 116. The conduit 116 in turn extends to the dispensing head 44 through the solenoid-actuated valve 118. Thus, the system 158 functions to discharge chilled water through the dispensing head 44 under the control of the solenoid-actuated valve 118.

The chilled water flowing through the other leg of the T-fitting 182 is directed through a conduit 186 and is sprayed into the interior of a container 188 mounted within the insulated portion of the housing 160. Carbon dioxide gas is received in the container 188 from the container 76 thereof and is bubbled into the standing liquid within the container 188 through an air stone-type outlet 190. The spraying of water into the carbon dioxide rich atmosphere within the container 188, and the bubbling of carbon dioxide gas through the standing liquid within the container 188 forms the liquid into carbonated water. The carbonated water is withdrawn from the container 188 in the manner indicated by the arrow 192 and is directed through a coil 194 positioned within the coil 172. Thus, the carbonated water is further chilled by heat transfer to the low temperature working fluid flowing within the coil 172. The carbonated water passing from the coil 194 is directed to the dispensing head 44 through the conduit 120 and the solenoid-actuated valve 122. Thus, carbonated water is discharged through the dispensing head 44 under the control of the solenoid-actuated valve 122.

Referring now to FIG. 2, the mixed drink preparation apparatus 20 is operated under the control of punched cards 200. Each card 200 comprises four vertical columns 202 representative of time periods of operation of the solenoid-actuated valves 118, 122, 126, and 130 to control the flow of liquids through the dispensing head 44. In one embodiment of the invention, the columns 202 of the cards 200 represent time periods of operation of 2 seconds, 4 seconds, 6 seconds and 8 seconds, it being understood that the time period of operation represented by each vertical column 202 is variable within the operation of the mixed drink preparation apparatus 20. Each punched card 200 further comprises 12 horizontal rows 204 each representative of and individual to one of the solenoid-actuated valves 118, 122, 126, and 130. In one embodiment of the invention, one of the rows 204 is individual to and represents the valve 118, one of the rows 204 is individual to and represents the valve 122, four of the rows 204
are individual to and represent the valves 126, and six of the rows 204 are individual to and represent the valves 130. It will be appreciated that the mixed drink preparation apparatus 20 may be provided with more than four valves 126 and/or with more than six valves 130, in which case the number of horizontal rows 204 comprising the card 200 is increased. Each card 200 further comprises printed indication 206 at one end thereof designating the particular mixed drink represented by the card.

Referring to FIG. 12, an electronic circuit 208 for operating the mixed drink preparation apparatus 20 under the control of the punched cards 200 is schematically illustrated. The circuit 208 includes four timers 210, 212, 214, and 216, each corresponding to one of the vertical columns 202 of the punched cards 200. Each of the timers 210, 212, 214, and 216 functions to operate a lamp 218 individual thereto. Each lamp 218 is positioned within an individual section 220 of a parabolic reflector 222 (only one of the four sections 220 of the reflector 222 is illustrated in FIG. 12). Each section 220 of the reflector 222 functions to direct light from its individual lamp 218 through one of the four vertical columns 202 of a punched card 200 positioned within the card reader slot 57.

Power for operating the electronic circuit 208 is supplied from an AC power source 223, adapted to be switched either on or off, through a transformer 224 to a diode rectifier circuit 225 having unfiltered positive and negative output DC power connections. The positive output is connected serially through a resistor 226, a photocell 227 positioned adjacent a lamp 228, and a resistor 229, and through additional circuitry to the negative connection of the diode rectifier circuit 225. Silicon controlled rectifier (SCR) 230 has an anode connection to the positive terminal of the circuit 225, a gate connection to the junction of photocell 227 and resistor 229, and a cathode connection to the opposite end of resistor 229. A photocell 231 is connected in parallel with resistor 229 between the gate and the cathode electrodes of SCR 230. Thus, with a card 200 inserted to block the path of light from the lamp 228 to the photocell 231, the photocell is converted from low to high resistance and the gate bias immediately becomes such as to result in activation of SCR 230 to conduction, which in turn results in immediate activation of the lamp 228 in each of the sections 220 of the parabolic reflector 222. However, in the event of a failure of the lamp 228 or a break in the electrical connections between the circuit 225 and the photocell 231, photocell 227 is converted from low resistance (light present) to high resistance (no light) and the gate to base bias level of SCR 230 is lowered. This results in deactivation of the SCR 230 upon the next downward fluctuation of the positive output of the unfiltered circuit 225, thereby preventing an undesired actuation of the circuit 208 as a result of a failure of the lamp 228, etc.

The cathode of the SCR 230 is connected through the lamps 228 in parallel to each other, respectively, diodes 241, 242, 243, and 244 having anodes connected to the lamps and cathodes connected to the card anode, respectively, of timing circuit SCRs 245, 246, 247, and 248. The SCRs 245, 246, 247, and 248 each have a cathode which is connected to the negative output of the circuit 225. Further, the cathode of SCR 230 is connected through a resistor 249 to the anode of a diode 250 having a cathode connection both through a capacitor 251 to the negative output of circuit 225, and also serially through resistors 252 and 253 to the negative output connection. The junction of resistors 252 and 253 is connected through resistors 254, 255, 256, and 257 of the timing sections 210, 212, 214, and 216, respectively, to the anodes of mixed drink 130 and 261, and to the anodes of diodes 262, 263, 264, and 265. The cathodes of diodes 262, 263, 264, and 265 are connected, respectively, to the anodes of diodes 266, 267, 268, and 269 having cathodes connected to the gates of SCRs 245, 246, 247, and 248, respectively.

The cathodes of SCRs 258, 259, 260, and 261 are connected to the negative output of circuit 225, while the gate electrodes thereof are connected to the junction of one base output electrode of unijunction transistors 270, 271, 272, and 273. Resistors 274, 275, 276, and 277 link this junction to the negative side of the circuit 225. The other base electrode of the unijunction transistors 270, 271, 272, and 273 are connected, respectively, serially through resistors 278, 279, 280, and 281, and resistors 282, 283, 284, and 285 to the timing circuit voltage supply connection with the junction of resistors 252 and 253. The junctions of resistors 278 and 282, 279 and 283, 280 and 284, and 281 and 285 are connected, respectively, through zener diodes 286, 287, 288, and 289 to the negative side of circuit 225, and serially through adjustable resistors 290, 291, 292, and 293, and capacitors 294, 295, 296, and 297 to the negative side of circuit 225. The junctions of resistors 290, 291, 292, and 293 with capacitors 294, 295, 296, and 297 are connected to the emitter electrodes of unijunction transistors 270, 271, 272, and 273 in order that the RC time constant developed voltages bias trigger their respective transistors 270, 271, 272, and 273 to provide a positive voltage output on the base electrodes connected to the gate electrodes of SCRs 258, 259, 260, and 261, thus providing actuation for conduction therethrough. This lowers the voltage level at the anodes of the SCRs 258, 259, 260, and 261 and at the gate electrodes of SCRs 245, 246, 247, and 248. The SCRs 245, 246, 247, and 248 are therefore deactivated with the next cyclic lowering of the positive voltage output of the circuit 225 at the respective time intervals determined by the RC time constant of the transistors 210, 212, 214, and 216 as determined by the adjustable resistors 290, 291, 292, and 293, and by the selected values of capacitors 294, 295, 296, and 297.

In addition to being connected to the anodes of SCR 230, the positive unfiltered output of circuit 225 is connected to the anode of SCR 298 as the power supply to solenoid coil 299 of the solenoid-actuated valves 118, 122, 126, and 130 of FIG. 7. The cathode of SCR 298 is also connected through resistors 300 and 301 to the junction of photocell 231, resistors 229 and 249, and the cathode of SCR 230. The junction of resistors 300 and 301 is connected to the gate electrode of SCR 298. This provides for rapid de-activation of SCR 298 and the positive de-activation of all of the solenoid-actuated valves 118, 122, 126, and 130, should for example, a card 200 be removed from the card reader slot 57 during the dispensing of a mixed drink, k and prior to the completion of the timing cycle.

Diodes 302 are connected in parallel with the solenoid coils 299 to protect SCRs 303 having anode connections to the coils from inductive voltage transients. The anode of each SCR 303 is also connected serially
through a resistor 304, a photocell 305 representative of a particular horizontal row 204 of the card 200, and a resistor 306 to connections with the cathode of the SCR and with the negative side of the circuit 225. The junction of each photocell 305 with the corresponding resistor 306 is connected to the gate electrode of the corresponding SCR 303, there being 12 SCRs 303 to match the number of horizontal rows 204 of the punched cards 200. Thus, so long as light is received by a particular photocell 305 through an opening in a card 200, the SCR 303 corresponding to such photocell 305 is actuated to a conductive state and the coils 299 are in turn actuated to open the corresponding solenoid-actuated valves 118, 122, 126, or 130. The time period of such action in turn depends on the RC time constant of the corresponding timers 210, 212, 214, or 216.

Referring now to FIG. 13, an electronic circuit 308 for registering the quantities of liquor dispensed by the mixed drink preparation apparatus 20 is schematically illustrated. A plurality of terminals 309 are each connected to the junction between one of the SCRs 303 and the corresponding coil 299 of the circuit 208 which in turn corresponds to one of the solenoid-actuated valves 130 of FIG. 7. The terminals 309 are in turn connected through diodes 310 to one terminal of the coil of a relay 312. The opposite terminal of the coil of the relay 312 is connected to the negative output of the circuit 225. Thus, whenever one of the solenoid-actuated valves 130 is actuated to dispense liquor through the dispensing head 44, the relay 312 is actuated to connect the positive output of the circuit 225 to a pair of counters 314 comprising the blender control/counter assembly 56.

A relay 316 is provided for selectively connecting the negative output of the circuit 225 to one or the other of the counters 314. The coil of the relay 316 has terminals 318 which are connected in parallel with one of the lamps 218. The relay 316 therefore assumes one or the other of its two states, depending on whether its corresponding lamp 218 is actuated. For example, the corresponding lamp 218 might be the lamp corresponding to the dispensing of a double shot of liquor, in which case one of the counters 314 would record the dispensing of each double shot of liquor and the other counter 314 would record the dispensing of each single shot of liquor by the mixed drink preparation apparatus 20. The two counters 314 of the blender control/counter assembly 56 thereby provide a combined output reading indicative of the total quantity of liquor dispensed by the mixed drink preparation apparatus 20.

From the foregoing, it will be understood that the present invention comprises an improved mixed drink preparation apparatus incorporating numerous advantages over the prior art. Perhaps one of the most important advantages resulting from the use of the invention involves the fact that liquors are dispensed thereby directly from the original liquor containers. This minimizes the problems of breakage, spillage, etc. which have characterized prior systems wherein it has been necessary to transfer the liquors from the original containers to containers especially adapted for use in the device. Another advantage to the use of the present invention involves the fact that is in turn helpful both in inventory control and in eliminating pilferage which has been a problem in the use of the prior art systems.

Although preferred embodiments of the invention have been illustrated in the accompanying Drawings and described in the foregoing Detailed Description, it will be understood that the invention is not limited to the embodiments disclosed, but is capable of numerous rearrangements, modifications, and substitutions of parts and elements without departing from the spirit of the invention.

What is claimed is:

1. An automatic mixed drink preparation apparatus comprising:

a housing including a bottom wall, front and back walls, opposed side walls, and a top wall defining a mixed drink preparation zone;

the back wall defining at least one openable panel to provide access to substantially the entire interior of the housing;

the housing defining therein a liquor receiving zone characterized by means for receiving a plurality of quantities of different liquors each in its original container;

means for within the housing for receiving a plurality of mix containers each having a quantity of mix therein;

means within the housing for receiving a water container having a quantity of water therein;

means within the housing for receiving a carbon dioxide container having a quantity of carbon dioxide therein;

a dispensing head mounted on the housing and extending into the mixed drink preparation zone at a point over the top wall of the housing;

drain container means mounted in the housing;

drain means for directing liquids from a point in the mixed drink preparation zone under the dispensing head to the drain container means;

a plurality of liquor pumps each for withdrawing liquor from one of the liquor containers in the liquor receiving zone and for discharging the liquor through the dispensing head;

valve means for controlling the flow of each liquor through the dispensing head under the action of the liquor pumps;

mix pumping means for withdrawing mixes from the mix containers and for discharging the mixes through the dispensing head;

valve means for controlling the flow of mixes through the dispensing head under the action of the mix pumping means;

mechanical refrigeration means mounted in the housing and comprising liquid chilling means;

water pumping means for withdrawing water from the water container and for directing the water through the liquid chilling means and through the dispensing head;

valve means for controlling the flow of water through the dispensing head under the action of the water pumping means;

carbonating means for receiving water from the water pumping means, for receiving carbon dioxide gas from the carbon dioxide container, and for forming carbonated water;

means for directing carbonated water from the carbonating means through the liquid chilling means and through the dispensing head;
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valve means for controlling the flow of carbonated water through the dispensing head;
said liquors, mixes, water, and carbonated water comprising a plurality of liquids available for use in formulating mixed drinks;
a plurality of selectable cards each corresponding to a particular mixed drink and each bearing input means representative of the particular mixed drink; and
electronic circuitry means responsive to the input means of the cards for selectively actuating predetermined valves for predetermined periods of time and thereby effecting discharge through the dispensing head of a predetermined quantity of each liquid from the plurality thereof that is required for the selected mixed drink.

2. The automatic mixed drink preparation apparatus according to claim 1 wherein each liquor pump comprises:
cylinder means;
piston means mounted for reciprocation in the cylinder means;
check valve means for admitting liquor from one of the containers thereof to one end of the cylinder means;
check valve means for directing liquor from said one end of the cylinder means to the dispensing head;
means for selectively admitting pressurized carbon dioxide gas from the carbon dioxide container to the opposite end of the cylinder means and thereby actuating the piston means to force liquor out of the cylinder means and through the dispensing head; and
spring means for subsequently returning the piston means and thereby drawing liquor into said one end of the cylinder means from the container thereof.

3. The automatic mixed drink preparation apparatus according to claim 1 wherein the mixing pumping means comprises:
means for directing pressurized carbon dioxide gas from the carbon dioxide container into each mix container; and
means for directing mix from each mix container through the dispensing head under the action of the pressurized carbon dioxide gas.

4. The automatic mixed drink preparation apparatus according to claim 1 wherein the electronic circuitry means further includes counter means for recording the quantity of liquid that is dispensed from the liquid containers in the liquid receiving zone through the dispensing head.

5. The automatic mixed drink preparation apparatus according to claim 1 wherein the mechanical refrigeration means further comprises:
means defining an enclosed zone;
means for circulating a chilled fluid within the enclosed zone; and
means for receiving water from the water pumping means and for circulating the water in the enclosed zone and thereby chilling the water by heat transfer to the chilled fluid circulated therein.

6. The automatic mixed drink preparation apparatus according to claim 5 wherein the carbonating apparatus further comprises:
container means mounted within the enclosed zone of the mechanical refrigeration means;
means for receiving water from the water pumping means and for discharging the water into the container means;
means for receiving carbon dioxide gas from the carbon dioxide container and for bubbling the carbon dioxide gas through liquid accumulated in the container means; and
means for receiving carbonated water from the container means and for circulating the carbonated water through the enclosed zone and thereby further cooling the carbonated water by heat transfer to the chilled fluid circulating therein.

7. An automatic mixed drink preparation apparatus comprising:
a housing including a bottom wall, front and back walls, opposed side walls, and a top wall defining a mixed drink preparation zone;
said walls of the housing defining therebetween a wholly closed liquid receiving zone characterized by means for receiving a plurality of quantities of different liquors each in its original container;
said walls of the housing defining a wholly enclosed mix receiving zone for receiving a plurality of quantities of different mixes each in a container;
said walls of the housing defining a wholly enclosed water receiving zone for receiving a quantity of water in a container;
said walls of the housing defining a wholly enclosed carbon dioxide receiving zone for receiving a quantity of carbon dioxide in a container;
a dispensing head mounted in the housing and extending into the mixed drink preparation zone at a point over the top wall of the housing;
drain container means supported in the housing;
drain means for directing liquid from the point in the mixed drink preparation zone through the dispensing head into the drain container means;
a plurality of liquor pumps each for withdrawing liquid from one of the liquor containers in the liquor receiving zone and for discharging the liquid through the dispensing head;
a plurality of valve means each for regulating the quantity of liquid discharged through the dispensing head by one of the liquor pumps;
means for withdrawing mixes from the mix containers in the mix receiving zone and for directing the mixes through the dispensing head;
a plurality of valve means each for regulating the quantity of mix discharged through the dispensing head from one of the mix containers;
mechanical refrigeration means defining liquid chilling means;
water pumping means for withdrawing water from the water container in the water receiving zone and for directing water through the liquid chilling means and through the dispensing head;
valve means for regulating the quantity of water discharged through the dispensing head;
means for carbonating water from the water pumping means and for receiving carbon dioxide gas from carbon dioxide containers in the carbon dioxide receiving zone and for forming carbonated water;
means for directing carbonated water from the carbonating means through the dispensing head;
valve means for regulating the quantity of carbonated water discharged through the dispensing head;
said liquors, mixes, water, and carbonated water defining a plurality of liquids available for use in formulating mixed drinks;
a plurality of cards each corresponding to a particular mixed drink and each bearing input means indicative of both the particular liquids to be used and the quantity of each liquid to be used in formulating the corresponding mixed drink; and
electronic circuitry means responsive to the input means of the cards for actuating the valve means to discharge predetermined quantities of one or more of the liquids comprising the plurality of liquids through the dispensing head.

8. The automatic mixed drink preparation apparatus according to claim 7 wherein the carbonating apparatus further comprises:
means for receiving water from the water pumping means and for discharging the water into the container means;
means for receiving carbon dioxide gas from the carbon dioxide container and for bubbling the carbon dioxide through liquid standing in the container means; and
means for receiving carbonated water from the container means and for circulating the carbonated water through the liquid chilling means.

9. The automatic mixed drink preparation apparatus according to claim 8 wherein the mechanical refrigeration means further comprises:
means defining an enclosed zone;
the container means of the carbonating apparatus being mounted within the enclosed zone;
means for circulating a chilled fluid within the enclosed zone and thereby chilling the contents of the container means of the carbonating apparatus by heat transfer to the chilled fluid; and
means for receiving water from the water pumping means and for circulating the water in the enclosed zone and thereby chilling the water by heat transfer to the chilled fluid circulating therein.

10. The automatic mixed drink preparation apparatus according to claim 7 further characterized by counter means responsive to each actuation of the electronic circuitry means to dispense liquor through the dispensing head for recording the quantity of liquor dispensed from the liquor containers in the liquor receiving zone.

11. The automatic mixed drink preparation apparatus according to claim 7 wherein each liquor pump comprises:
a cylinder;
a piston mounted for reciprocation within the cylinder;
means for admitting liquor from one of the liquor containers to one end of the cylinder;
means for directing liquor from said one end of the cylinder to the dispensing head;
means for selectively admitting pressurized carbon dioxide gas from the carbon dioxide container to the opposite end of the cylinder and thereby actuating the piston to force liquor out of the cylinder and through the dispensing head; and
means for subsequently returning the piston from the opposite end of the cylinder and thereby drawing liquor out of the liquor container and into said one end of the cylinder.

12. The automatic mixed drink preparation apparatus according to claim 7 wherein the mix pumping means comprises:
means for directing pressurized carbon dioxide gas from the carbon dioxide container in the carbon dioxide receiving zone into each of the mix containers in the mix receiving zone and thereby pressurizing the mix containers; and
means for directing mix from each mix container through the dispensing head under the action of the pressurized carbon dioxide gas therein.

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