

June 15, 1948.

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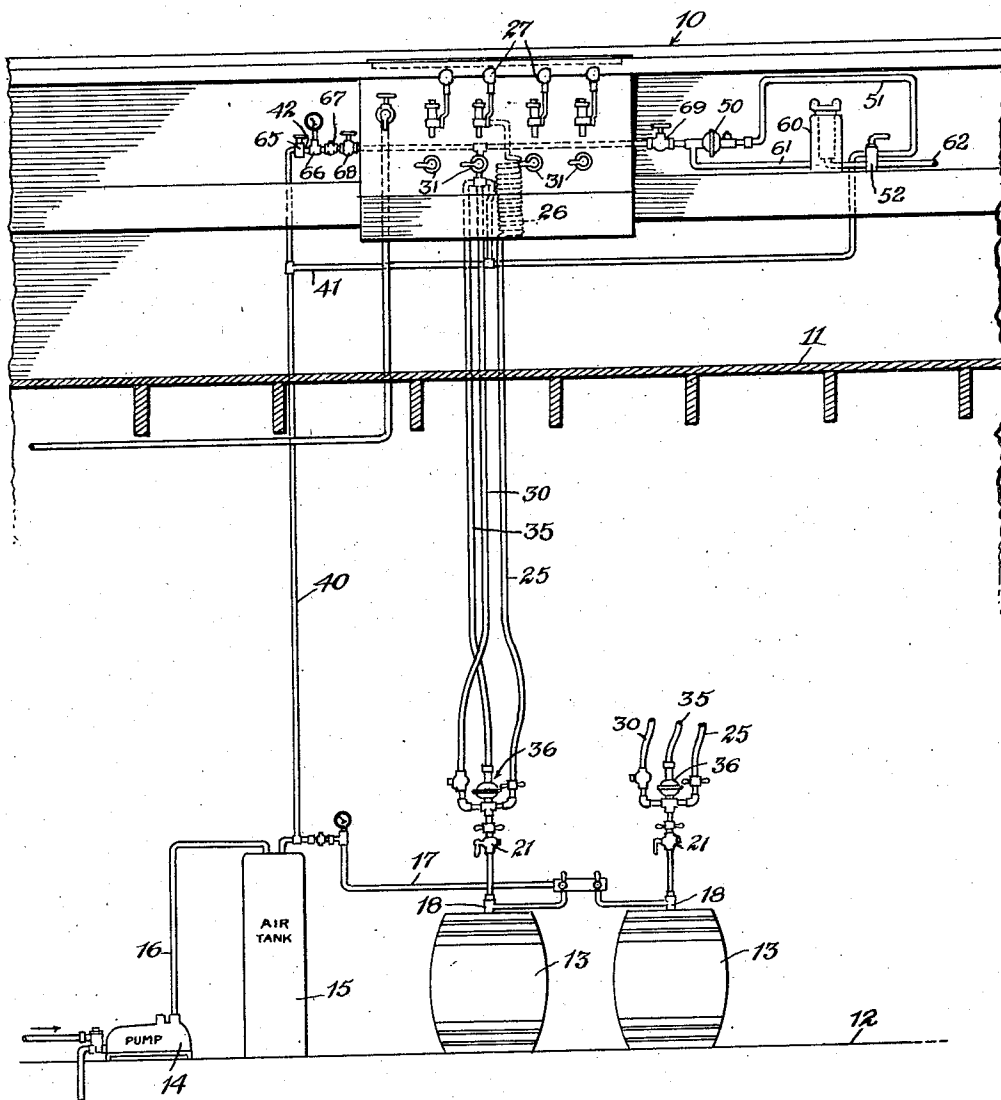
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BEER CONTROL AND PIPE-CLEANING APPARATUS

Filed Dec. 8, 1944

2 Sheets-Sheet 1

Fig. 1.



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Fig. 2.

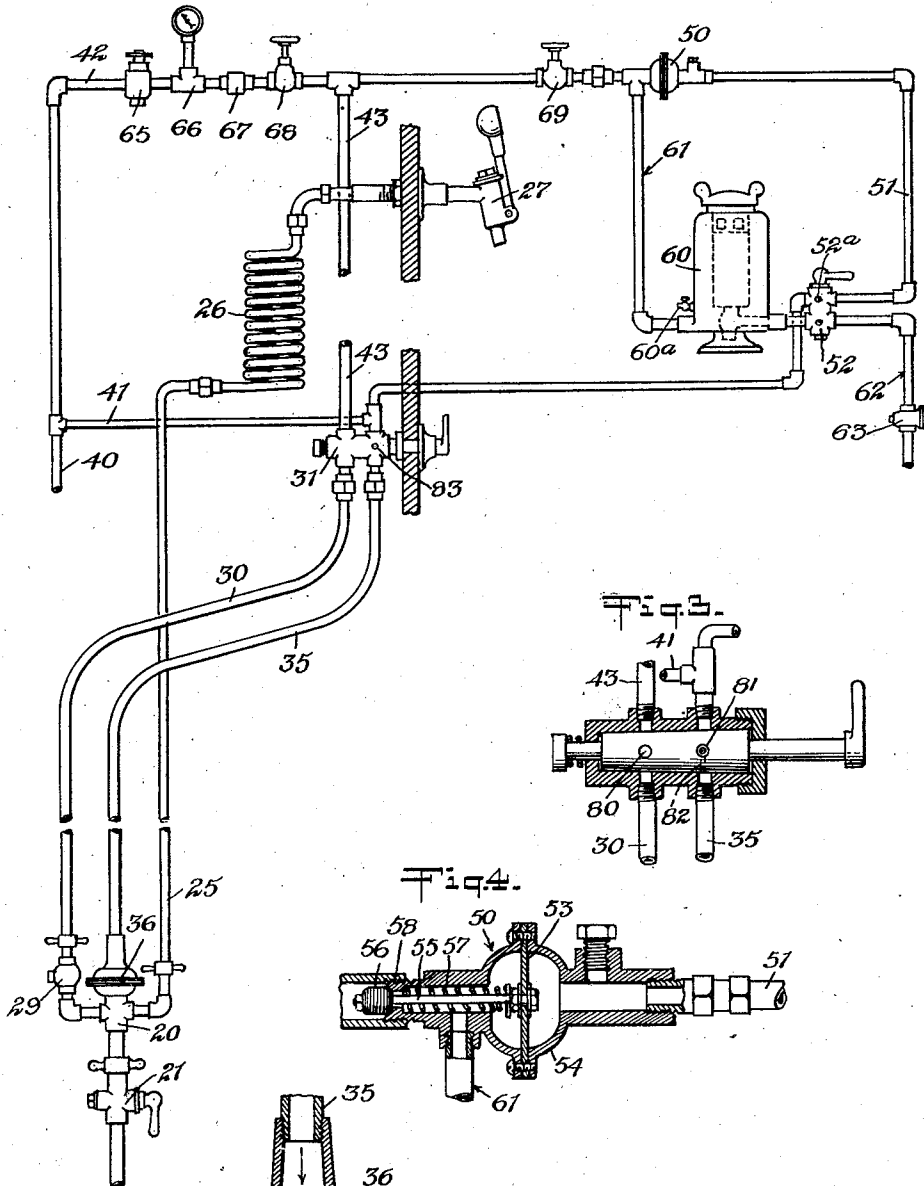


Fig. 3.

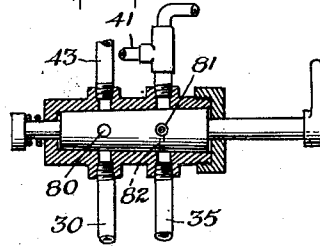


Fig. 4.

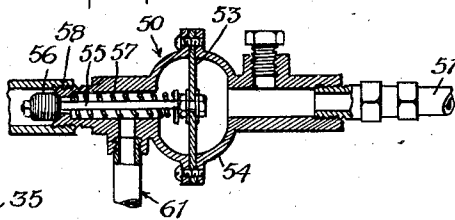
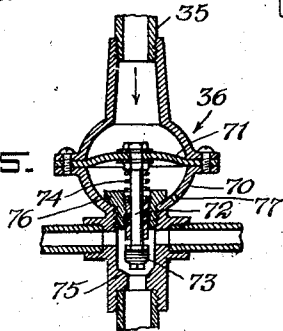


Fig. 5.



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2,443,550

BEER CONTROL AND PIPE-CLEANING
APPARATUS

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Application December 8, 1944, Serial No. 567,203

3 Claims. (Cl. 225-12)

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This invention relates to beverage dispensing apparatus in which pipe connections extend from the beverage containers to the dispensing faucets and air or carbonic gas pipes extend from a pump or tank to the beverage containers for supplying the pressure needed to raise the beverage from the containers to the dispensing faucets. More especially, this invention relates to arrangements for cleaning the beverage piping.

The pipe cleaning operation in such dispensing apparatus in general use today, is performed with special portable apparatus which necessitates disconnecting the pipe system from the beverage containers for cleaning and flushing. The operation is usually performed when the beverage dispensing apparatus is not in use and when it is performed during service hours service is necessarily discontinued during the pendency of the operation. This method is poor at best; it does not encourage or permit of sufficiently frequent and sufficiently thorough cleaning operations to insure at all times the best sanitary and palatable conditions. It also causes a serious loss of beverage contained in the pipe lines extending from the containers to the dispensing faucets. In addition to these serious shortcomings, this method is inconvenient and costly.

To overcome these objections, methods and apparatus have been invented for cleaning the pipe lines without causing loss of beverage and without disconnecting the pipe lines from the beverage containers. Invariably, however, these new methods and apparatus are complicated and impractical. In most cases the beverage in the pipe lines is saved by driving it back into the containers before the cleaning operation is started. This is an undesirable practice for the reason, among others, that the beverage from the unclean pipes would have a deleterious effect upon the beverage in the containers. Thus, despite the great shortcomings of the first mentioned method, the last mentioned methods and apparatus have not been generally accepted.

The principal object of the present invention is to provide a practical method and means for encouraging and permitting the frequent cleaning of the pipe system at any time during as well as outside of service hours, without loss of beverage, without the necessity for returning the beverage in the pipe lines back to the beverage

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containers, without the necessity for disconnecting the pipe lines from the beverage containers and without the employment of special portable apparatus.

Another object is to provide apparatus of the character described, having easily accessible controls located in the immediate vicinity of the dispensing faucets.

A further object is the provision of safety control means which function automatically to prevent accidental fouling of the cleaning and flushing system, as for example, the passage of cleaning fluid into the beverage containers.

These and other objects are attained by mechanism illustrated in the accompanying drawing in which—

Fig. 1 is a front elevation of the entire system showing its application to a beer dispensing unit and showing one of a plurality of beer barrels connected to one of a plurality of beer dispensing faucets;

Fig. 2 is a partly diagrammatic view of the system as a whole;

Fig. 3 is a sectional view of the master valve controlling said system;

Fig. 4 is a sectional view of a diaphragm safety valve used in the automatic safety control mechanism of said system; and

Fig. 5 is a sectional view of another diaphragm safety valve used in the automatic safety control mechanism of said system.

The present invention is shown in the drawing as applied to beer dispensing apparatus. The invention has equal application to other types of beverage dispensing apparatus in which compressed air or carbonic gas supplies the pressure for raising the beverage from the beverage containers, through a pipe system, to the dispensing faucets.

In Fig. 1 a typical arrangement of beer dispensing apparatus is shown. The serving counter or bar 10 is shown resting on the floor 11 of the store or restaurant. Below it, on the basement floor 12 stand the beer barrels or other containers 13 as well as air pump 14 and compressed air tank 15. A pipe 16 delivers compressed air from the pump to the tank and a pipe 17 delivers compressed air from the tank to the beer barrels through taps 18.

Referring now to Fig. 2, a cross coupling 20

is connected to the tap of one of the barrels by means of the usual assortment of pipe and pipe couplings. A stop cock 21 is disposed between the cross coupling and the tap. Connected to one of the ports of the cross coupling by means of the usual series of pipe and pipe couplings is a pipeline 25 which leads to the coil 26 in the cooling system and connected to the other end of the coil by means of the usual type of connecting pipe and pipe coupling members is the dispensing faucet 27. Pipe 25 is the beverage pipeline, the beverage passing therethrough from the beer barrel to the dispensing faucet.

A second pipeline 30 is connected to a second port of cross coupling 20 and to a double or master valve 31 by means of the usual pipe fittings. Pipeline 30 is one of the two air lines of the system and its function will hereafter appear. A check valve 29 is mounted in the lower end of pipeline 30 and its function will also hereafter appear.

A third pipeline 35 is connected at one end to a diaphragm valve 36 and at the other end to the second port in the double or master valve 31. Diaphragm valve 36 is connected to the third port of cross coupling 20. Pipeline 35 is also an air line. Its part in the general system will hereinafter appear. It may be said, however, at this point, that it is a major element in the safety control apparatus of the system.

A main pipeline 40 extends from the air tank 15 to two branch or auxiliary pipelines 41 and 42, respectively. Branch line 41 communicates with the safety air line 35 through the master valve 31. Branch line 42 communicates with air line 30 through a secondary branch line 43 and master valve 31.

Branch line 42 is also in communication with a diaphragm valve 50. Branch line 41 is similarly in communication with the other side of said diaphragm valve through a series of pipes and pipe connections 51 and a secondary double valve 52. The diaphragm 53, in said diaphragm valve, prevents communication between branch lines 41 and 42 through valve 50.

Branch line 42 also communicates with a container of washing and cleaning fluid 60 through the usual series of pipe fittings and pipe members 61. Container 60 communicates at its other side with a source of water under pressure (not shown) through secondary double valve 52 and a series of pipe and pipe connections 62. A regulator 63 controls the water pressure. A pressure of 25 pounds has been found to be a desirable pressure.

It will be seen that branch line 42 between main line 40 and secondary branch line 43 is provided with the following devices: a regulator 65, a pressure gauge 66, a check valve 67 and a stop cock 68. Branch line 42 is also provided with a second stop cock 69 at a point between secondary branch line 43 and pipelines and connections 61.

Referring now to Fig. 5, diaphragm valve 36 comprises a housing 70 which is separated into upper and lower compartments by means of diaphragm 71.

The diaphragm prevents communication between the upper and lower compartments. Affixed to the diaphragm is a shaft 72 which carries at its free end a fuller ball 73. A torsion spring 74 normally maintains said shaft and hence said diaphragm in an elevated position. In such position of the shaft, the fuller ball is out of contact with its seat 75. It is clear from Fig. 5 that when the fuller ball is caused to move in a downward

direction against the tension of the spring until it rests against seat 75, all passage of fluid up through the pipelines leading from the beer barrel is brought to an end. It is equally clear that when the fuller ball is in its normal elevated position, there is communication between the pipeline leading to the beer barrel on the one hand and pipelines 25 and 30 on the other hand through their respective pipe fittings. A packing box 76 prevents any flow of beer into the lower compartment. Should some beer seep or leak into said compartment, however, it will pass out through drain hole 77.

Referring now to Fig. 4, it is clear that diaphragm valve 50 is of substantially similar construction to that of diaphragm valve 36 but that it functions in the opposite way. Diaphragm valve 50 comprises a housing 54 which is divided into right and left compartments by means of diaphragm 53. As has above been indicated, communication between said compartments is prevented by diaphragm 53. Affixed to the diaphragm is a shaft 55 which carries at its free end a fuller ball 56. A torsion spring 57, together with the pressure of the water in the system, normally urge said shaft and hence the fuller ball and diaphragm to the right and thereby cause the fuller ball to rest against its seat 58. When the fuller ball is in its normal position in closed contact with its seat 58, communication between branch line 42 and pipelines and connecting members 61 is prevented. When the fuller ball is moved to the left against the tension of the spring, and the pressure of the water, communication between said branch line 42 and said pipelines and connections 61 is effected.

A detailed view of the master double valve 31 is shown in Fig. 3. It is a valve of conventional construction having two port holes 80 and 81 respectively. Port hole 80 effects communication between air line 30 and secondary branch line 43. Port hole 81 effects communication between air line 35 and branch line 41. It will be seen that a branch port hole 82 connects port hole 81 with an escape vent 83 formed in the housing of the valve. The function of this escape vent and the branch port in communication therewith will hereinafter be explained.

The system operates as follows: The compressed air from tank 15 enters the beer barrel 13 through pipeline 17 and its connecting members. It forces the beer up through stop cock 21 which is normally open, coupling 20, beer line 25, cooling coil 26 and dispensing faucet 27. When it is desired to clean the beer line 25 and the coil 26 as well as the connecting pipe members and fittings which connect said coil with said dispensing faucet, the following is done: master valve 31, which is normally in closed position, is opened. This causes compressed air to flow from the air tank through main line 40, branch line 42 and secondary branch line 43 into air line 30. It also causes air to flow from the air tank through the main line 40 and branch line 41 into the safety air line 35. When compressed air enters the safety line 35, it causes diaphragm valve 36 to close and prevents any further flow of beer from the beer barrel. The compressed air in air line 30 maintains pressure on the beer remaining in beer line 25 and coil 26. It thus becomes possible to dispense said remaining beer in the usual way by merely opening faucet 27. Compressed air in air line 30, controlled by regulator 65, will cause said beer to flow through beer line 25, coil 26 and out through faucet 27. A reverse flow of the beer into

pipeline 30 is at all times prevented by check valve 29. When all of the remaining beer is dispensed, the pipes are ready for the cleaning operation.

Valve 68 may now be closed although in view of the presence of the check valve 67, this is not entirely necessary. Valve 69 is now opened, water from the source of water now passes through valve 52 which is normally kept open, and through cleaning fluid container 60, and thence through diaphragm valve 50 which is normally kept open as will hereinafter appear, valve 69, branch line 42, secondary branch line 43, master valve 31 and air line 30; thence through coupling 20, beer line 25, coil 26 and faucet 27. Check valve 67 will prevent water from entering air line 40 when valve 68 is left open. This flushing process continues until the beer lines are made clean. Valve 69 is now closed and valve 68 opened. This causes a blast of compressed air to pass through secondary branch line 43, master valve 31, air line 30, coupling 20, beer line 25, coil 26 and dispensing faucet 27, thereby blowing said passages through. The cleaning operation is now complete. In order to prepare the system for dispensing beer again, master valve 31 is closed, the compressed air in safety line 35 escapes through the branch port 82 and the safety vent 83. Pressure on the diaphragm of valve 35 is now released and the valve opens. Compressed air from the air tank passing through pipeline 17 and into the beer barrel now forces the beer up through stop cock 21, coupling 20, beer line 25, coil 26 and dispensing faucet 27.

The safety apparatus of the system functions as follows: It has been said that double valve 52 is normally kept open. Compressed air, therefore, normally passes through main line 40, branch line 41, valve 52 and pipes and pipe connections 51 into the right hand compartment of diaphragm valve 50. The pressure of said compressed air against the diaphragm 53 causes said valve to open. It will be noted that the pressure of the compressed air against diaphragm 53 is equal to the pressure of the compressed air in safety air line 35 against diaphragm 71 when the master valve 31 is opened. Let us now assume that there is a failure of the compressed air supply during the cleaning operation. This would cause diaphragm valve 35 to open and diaphragm valve 50 to close. Since diaphragm valve 50 controls the flow of water and cleaning fluid into the system, no water or cleaning fluid will pass into the system when the pressure of the compressed air is so low that diaphragm valve 35 is caused to open and communication is effected between pipelines 30 and 25 on the one hand and pipeline leading into the beer barrel on the other. Water and cleaning fluid are thus prevented from entering the beer barrel and spoiling the beer. When the system is not in use, or when it is desired to replenish the cleaning fluid supply in tank 60, valve 52 may be closed. A vent 52a in said valve opens when the valve closes, and the air in pipeline 51 escapes. This relieves the pressure on the diaphragm in valve 50. The fluid may be drained off, when desired, through drain cock 60a.

The invention hereinabove described may be modified in a number of ways without departing from the basic principles thereof. Essentially, the invention is intended to provide a practical method and means of exhausting beverage from the pipeline system before cleaning said system and to provide a practical and simple method and means of cleaning the system. All of

the controls which a single operation of the character above described necessitates manipulating are available to the operator in the immediate vicinity of the dispensing faucet.

I claim:

1. In beverage dispensing apparatus in which fluid pressure forces a beverage out from a beverage container into and through a pipe line system, and thence into and through a dispensing faucet, a diaphragm valve controlled by fluid pressure for closing off the pipe line system from the beverage container, air pressure means for forcing the beverage that remains in the pipe line system into and through the dispensing faucet for dispensing, valve means for admitting cleaning fluid under pressure into said pipe line system after the remaining beverage therein contained has been dispensed, and a second diaphragm valve controlled by fluid pressure for controlling the flow of the cleaning fluid into the pipe line system, and means closing said second diaphragm valve when the first diaphragm valve accidentally opens.

2. In beverage dispensing apparatus in which fluid pressure forces the beverage out of a beverage container into and through a pipe line system and thence into and through a dispensing faucet, a source of compressed air, an air line connecting said source of compressed air to the beverage pipe line system at the point where said beverage pipe line system is connected to the beverage container, an air-controlled diaphragm valve which closes off the beverage container from the beverage pipe line system, a manually operated valve connected to the compressed air line controlling the flow of compressed air through said air line and into the beverage pipe line system, a second air line connecting the manually operated valve to the diaphragm valve, whereby when the manually operated valve is open, the diaphragm valve is caused to close thereby preventing beverage from passing out of the beverage container and into the beverage pipe line system, the opening of said manually operated valve also providing a flow of compressed air into and through the beverage pipe line system, additional valve means for closing off the first-mentioned compressed air line from the beverage pipe line system, a source of cleaning fluid under pressure, valve means for admitting said cleaning fluid into the beverage pipe line system, and a second air-controlled diaphragm valve also connected to the manually operated valve which controls the flow of the cleaning fluid into the beverage pipe line system, the first diaphragm valve being a normally open valve which is closed by the pressure of the compressed air said second diaphragm valve being a normally closed valve which is opened by the pressure of the compressed air.

3. In beverage dispensing apparatus in which fluid pressure forces a beverage out of a beverage container into and through a pipe line system, and thence into and through a dispensing faucet, a normally open compressed air controlled diaphragm valve connected to the beverage pipe line system and controlling the flow of beverage from the beverage container into the beverage pipe line system, a source of compressed air, a manually operated valve connected to said source of compressed air, a compressed air line connecting said manually operated valve to the diaphragm valve whereby the diaphragm valve is caused to close when the manually operated valve is opened, thereby preventing the passage of beverage from

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the beverage container into the beverage pipe line system, a second compressed air line connecting said manually operated valve to the beverage pipe line system, whereby when the manually operated valve is opened a flow of compressed air is caused to pass into and through the beverage pipe line system, additional valve means for shutting off the flow of compressed air into the beverage pipe line system, a source of cleaning fluid under pressure, a pipe line connecting said source of cleaning fluid to the beverage pipe line system, a normally closed air-controlled diaphragm valve connected to the cleaning fluid pipe line and controlling the flow of cleaning fluid into the beverage pipe line system, another compressed air line connecting the manually operated valve to the second diaphragm valve whereby when the manually operated valve is opened, the second diaphragm valve is caused also

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to open, thereby permitting a flow of cleaning fluid to pass into the beverage pipe line system.

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