Dec. 3, 1935. H. M. ERDMANN 2,022,882

APPARATUS FOR CLEANING LIQUID CONDUITS

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Fig. 1.

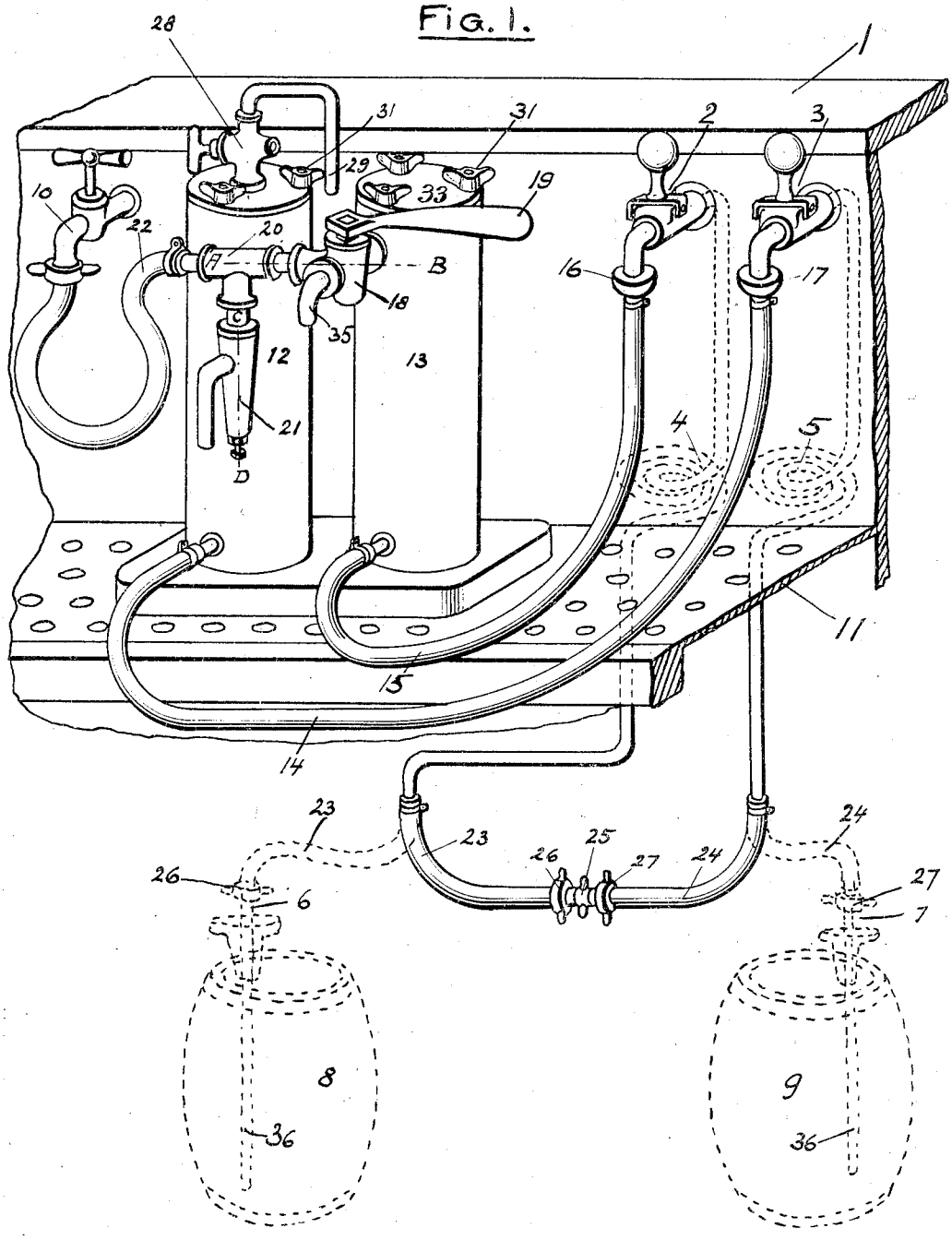


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FIG. 2.

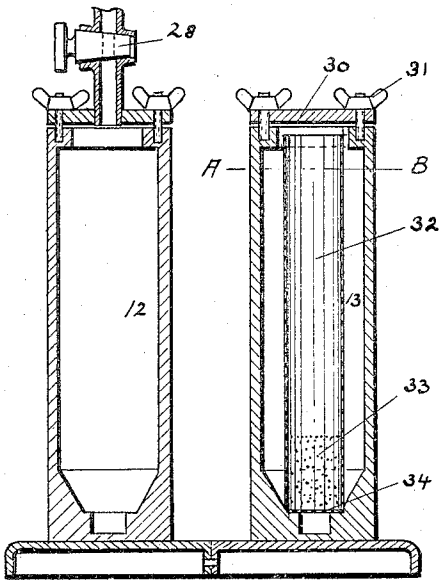



FIG 3.

SECTION A-B.

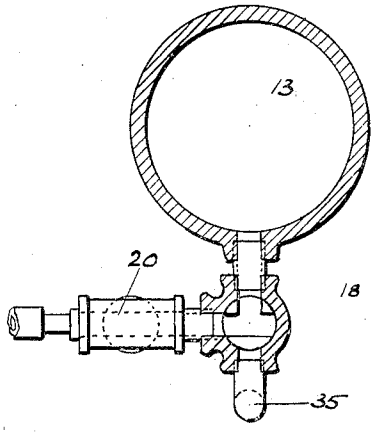



FIG. 4.

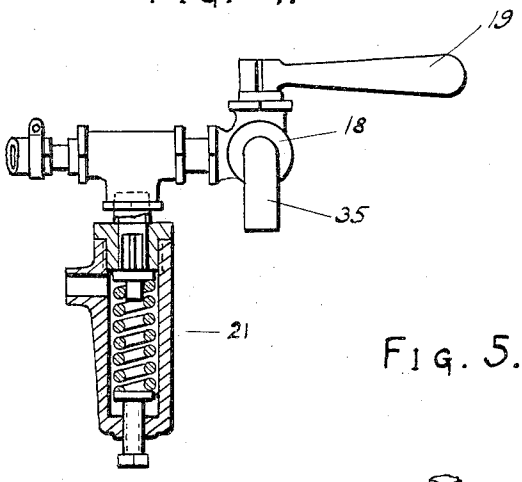



FIG. 5.

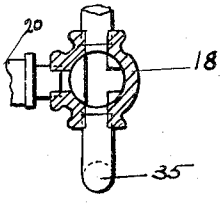
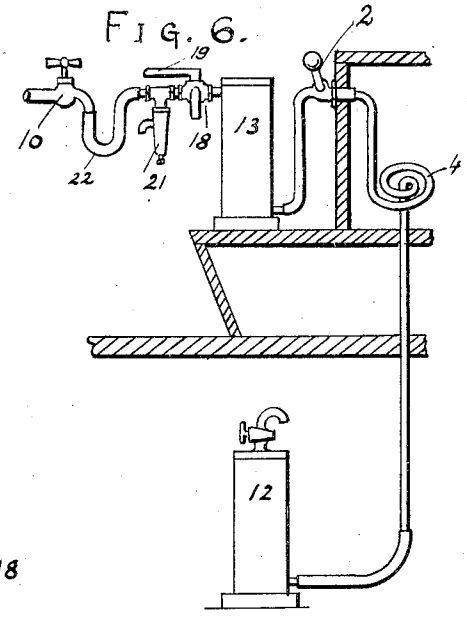



FIG. 6.

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# UNITED STATES PATENT OFFICE

2,022,882

## APPARATUS FOR CLEANING LIQUID CONDUITS

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Application August 15, 1933, Serial No. 685,187

5 Claims. (Cl. 225—12)

This invention relates to an apparatus and process for cleaning conduits or pipes through which liquids are conducted and which require periodical cleansing, and is useful particularly for cleansing coils through which beer flows from a barrel out of a tap. The object of the invention is to provide a simple, compact device for this purpose, simple of operation by unskilled help, readily attachable and detachable to the conduits, "foolproof", capable of performing its operations expeditiously, and utilizing a minimum of cleaning material.

In the drawings, Fig. 1 represents an elevation in perspective of the device of this invention attached to the taps and cooling conduits or coils of a beer drawing system; Fig. 2 is a vertical section of the two tanks shown in Fig. 1; Fig. 3 is a sectional view on the line *a—b* of Figs. 1 and 2; Fig. 4 is in part a sectional view on the line *c—d* of Fig. 1; Fig. 5 is a view corresponding in part to Fig. 3, showing the valve of Fig. 3 in a definitely adjusted position; Fig. 6 is a diagrammatic view of the method of attaching the device showing a single beer coil to be cleaned in contra-distinction to cleaning two taps simultaneously as shown in Fig. 1.

A bar, and the pertinent apparatus, for serving beer has been shown for the purpose of illustrating this invention but it will be obvious that this invention may be utilized in connection with other forms of apparatus which require cleansing from time to time by reason of contamination or soiling by the constant passage of liquids or fluids therethrough.

The bar 1 has attached thereto the usual taps 2 and 3 with which the coils or conduits 4 and 5 are in communication and at the other ends 6 and 7 communicating with the usual beer barrels 8 and 9. The bar is also provided with the usual water tap 10 connected to the water service line (not shown) and with the usual perforated drain board 11 which has a suitable connection with a sewer pipe (not shown).

The cleansing apparatus is provided with a pressure receptacle shown for illustration as a tank 12 and a cleaner receptacle shown for illustration as a tank 13. The pressure tank 12 by means of the connecting member 14, communicates with the tap 3 and the cleaner tank 13 by means of the connecting member 15, communicates with the tap 2. The connecting members 14 and 15 are preferably made of rubber tubing, one end of each being secured to pieces of metal tubing positioned in the lower portions of the tanks 12 and 13, as shown in Fig. 1. The free ends of the connecting members 14 and 15 are provided with rubber friction attaching bulbs 16 and 17 whereby communication is established between the inside of the tanks 12 and 13, the interior areas of the taps 2 and 3 and the conduits 4 and 5. The cleaner tank 13 is provided with a three way outlet cock or valve 18 and a handle 19 by which the position of the three way valve may be adjusted. The valve 18 is provided with a branch 20 having an adjustable relief valve 21 depending therefrom and in communication with the branch 20 and the valve 18 and therethrough with the interior of the cleaner tank 13. The branch 20 carries the rubber hose connecting member 22, the end of which is removably secured by a suitable screw threaded fixture to the water tap 10. The conduits or coils 4 and 5, at their lower ends, in proximity to the beer barrels, are connected together by means of the two sections of rubber hose 23 and 24 placed in detachable communication by means of the connecting member 25 screwed to the members 26 and 27. The hose sections 23 and 24 and the fixtures 26 and 27 are part of the usual equipment of the beer drawing system and are shown in dotted lines in the position which they occupy when the taps are connected with the beer barrels. During the cleansing operation these sections of hose are brought and secured together as illustrated in Fig. 1, by means of the connecting member 25.

The pressure tank 12 is provided at the upper end thereof with an outlet valve 28 to which is connected a drain pipe 29. The top plate 30 of the cleaner tank 13 is removably secured to the body of the tank by means of the thumb screws 31 in order that the top plate may be removed to insert and remove the fine mesh wire basket 32 in which a suitable cleaning compound 33 may be placed and the wire basket then dropped into the interior of the cleaner tank 13 as shown in Fig. 2. The interior of the cleaner tank is preferably made with a seat 34 to centrally dispose the wire basket 32 with respect to the interior wall of the tank 13. The type of cleaning material which is utilized is optional and may be in the form of a powder or liquid, or any other suitable form. If a liquid is used the basket 13 is not required and the liquid may be introduced directly into the cleaner tank 13.

The three way cock or valve 18 is illustrated in Fig. 3 and is of such a character that communication to the spout 35 may be established or disestablished by turning the handle 19 and likewise communication to the branch 20 may be established or disestablished by a similar manip-

ulation of the handle 19. Fig. 3 shows the valve open and communication established between the interior of the tank and the branch 20 and consequently to the faucet 10 while in Fig. 5 communication to the branch 20 has been closed and communication to the spout 35 has been established. This valve is so organized that when communication with the interior of the tank through the branch 20 is established, communication to the tap 35 is closed and when communication to the tap 35 is established communication to the branch 20 is closed.

The operation of the device is as follows: The apparatus, having been connected and arranged as shown in Fig. 1 (the beer having been allowed to drain from the conduits and the sections of hose 23 and 24 in communication, the taps connected to the connecting members 14 and 15, the rubber hose connected to the faucet 10, the valve 18 open to communicate with the branch 20 as shown in Fig. 3 and the cleaning material in the tightly closed tank 13), water is turned on and the pressure of the water, from the service line, forces water through hose 22, branch 20, valve 18, tank 13 (where the cleaning material is diluted and carried along with the water), through the connecting member 15, tap 2, conduit 4, hose 23, connection 25, hose 24, conduit 5, tap 3, connecting member 14, into pressure tank 12. The water continues to flow throughout the described system and tends to build up a pressure in the system substantially equal to the pressure permitted by the setting of the relief valve 21. The relief valve is set so as to open under pressure of the water before the pressure builds up so as not to burst or destroy the weakest portion of the circulating system which is usually the conduits or coils 5. The pressure in the tanks and in the circulating system is preferably not raised above thirty pounds, inasmuch as it has been found that this is about the maximum pressure that the coils or conduits 4 and 5 will stand without bursting and the relief valve 21, accordingly is set to function at this pressure although the pressure on the water service line is often as high as from 75 to 100 pounds. When the relief valve 21 opens clean water will flow therefrom as it reaches such valve from the water tap 10. The flow of water from the spout of the relief valve 10 will indicate to the attendant that the cleaning solution has passed through the system and that the maximum set pressure has been reached. The attendant will thereupon manipulate the handle 19 so as to move the three way valve to the position shown in Fig. 5 thereby closing communication between the tank 13 and the branch 20 and opening communication between the spout 35 and the tank 13 whereupon the air initially trapped in the upper portion of the tank 13 escapes. The system having been relieved of pressure, the relief valve 21 will close. The attendant then manipulates the handle 19 in order to close communication between the spout 35 and the tank 13 and open communication to the branch 20, permitting the repeated flow of water into the tank 13 and through the system and forcing the cleansing fluid again under pressure through the system. When the pressure again builds up to the degree required to operate the relief valve 21, the attendant upon the escape of water from the relief valve 21 again manipulates the handle 19 to close the valve to the branch 20 and open the valve to the spout 35 whereupon water escapes from the spout 35, primarily clean water from the water tap 10 and without any substantial loss of the cleaning fluid. The valve 18 is again manipulated, as soon as the pressure is relieved, to shut off communication to the spout 35 and open communication to the branch 20. These operations of alternately opening and closing the valve 18 are repeated in the same sequence and cycle a number of times. It has been found that repeating these operations about ten times results in a thorough cleansing of all slime and foreign matter accumulating on the inside of the pipes and the total time for conducting the cleansing operations approximates about ten minutes.

When the cleaning manipulations have been completed, the outlet valve 28 is opened and water from the tap 10 is permitted to flow through the entire system out of the drain pipe 29 and thoroughly flush the entire system and apparatus.

The beer, or other liquid, in the conduits is permitted to drain therefrom before the cleaning device is attached in order to replace the beer in the conduits with air. When the device is operated the air in the conduits is forced into the pressure receptacle 12 and compressed by the pressure of the water service line to substantially the degree at which the relief valve is set. The air pressure thus built up forces the cleaning fluid backwardly through the conduit system each time the three way cock is turned to close the branch 20 and open the spout 35.

It has been found that the cleansing solution not only moves through the system under pressure of the water but when the pressure is relieved by the relief valve 21 and the escape of water from the spout 35, the cleansing fluid is mixed bringing unused portions of the cleansing fluid into contact with the surface of the conduits. It will be obvious that by this arrangement the entire beer system is cleansed including the hose portions 23 and 24 and the interior of the taps 2 and 3. It is not necessary to clean the stems 36 which enter the barrels inasmuch as it is a practice to keep a reserve of this portion of the apparatus at hand and to replace them periodically and clean the ones last in use separately.

The rubber friction bulbs 16, 17 are preferably used inasmuch as they are retained on the taps 2 and 3 frictionally and should the relief valve 21 stick the pressure of the system will blow one of these friction bulbs off its tap before the pressure builds up a degree sufficiently to injure the circulating system.

Fig. 6 diagrammatically illustrates how the apparatus may be used in connection with a single tap and coil or conduit. In some instances bars are equipped with but a single tap and in such cases the apparatus must be attached as illustrated in Fig. 6 or for that matter where a plurality of taps are provided in a bar that may be cleaned singly by arranging the apparatus as shown in Fig. 6. It will be obvious by reference to Fig. 6 that the position of the tank 13 and its connections remain the same as in Fig. 1 but the bulb 17 is secured to the lower end of the single conduit 4 by pressing it over the end of the connecting member 25. In other respects the apparatus is operated as above described. In such instances in which the conduits to be cleaned are capable of withstanding the full pressure of the water service supply, it is not necessary to provide the apparatus with the relief valve 21.

I claim:

1. In a device for cleaning conduits, a pair of

receptacles, each receptacle being provided with a connecting member adapted to be secured to opposite ends of a conduit liquid conducting system, one of said receptacles being provided with means for connecting one of said receptacles with a source of water supply under pressure and to normally have a medium under pressure conveyed to it, said receptacles when associated with said liquid conducting system and said source of pressure, being normally air-tight, a valve in said water connection controlling the inflow of water to said receptacle and controlling the outflow of water from said receptacle, said valve being provided with a water escape opening adjustable to shut off the water from said source of water supply and simultaneously permit the escape of water from said water escape opening.

2. In a device for cleaning conduits, a pair of receptacles, each receptacle being provided with a connecting member adapted to be secured to opposite ends of a conduit liquid conducting system, one of said receptacles being provided with means for connecting one of said receptacles with a source of water supply under pressure and to normally have a medium under pressure conveyed to it, said receptacles when associated with said liquid conducting system and said source of pressure, being normally air-tight, a valve in said water connection controlling the inflow of water to said receptacle and controlling the outflow of water from said receptacle, said valve being provided with a water escape opening adjustable to shut off the water from said source of water supply and simultaneously permit the escape of water from said water escape opening, a relief valve adapted to retain the pressure in the valve below the pressure of said water supply system.

3. In a device for cleaning conduits, a pair of receptacles, each receptacle being provided with a connecting member adapted to be secured to opposite ends of a conduit liquid conducting system, one of said receptacles being provided with means for connecting one of said receptacles with a source of water supply under pressure and to normally have a medium under pressure conveyed to it, said receptacles when associated with said liquid conducting system and said source of pressure, being normally air-tight, a valve in said water connection controlling the inflow of water to said receptacle and controlling the outflow of water from said receptacle, said valve being provided with a water escape opening adjustable to shut off the water from said source of water supply and simultaneously permit the escape of water from said water escape opening, one of said receptacles being provided with an outlet for the escape of water during flushing.

4. In a device for cleaning conduits, a cleaner tank, an expansion tank, means to connect the cleaner tank with the conduit to be cleaned, means to connect the expansion tank with the conduit to be cleaned, a water connection from a suitable source of water supply under pressure to said cleaner tank and to normally have a medium under pressure conveyed to it, said tanks when associated with said conduits and said source of pressure, being normally air-tight and means to relieve the pressure.

5. In a device for cleaning conduits, a pair of receptacles adapted to be connected to portions of a conduit liquid conducting system, one of said receptacles being adapted to be connected to a constant source of water pressure and to normally have a medium under pressure conveyed to it, said receptacles when associated with said liquid conducting system and said source of pressure, being normally air-tight, means associated with one of said receptacles to relieve the pressure therein.

HANS M. ERDMANN.