

S. C. LAIDLEY.
 APPARATUS FOR CLEANSING TUBES.
 APPLICATION FILED JULY 29, 1910.

1,056,696.

Patented Mar. 18, 1913.

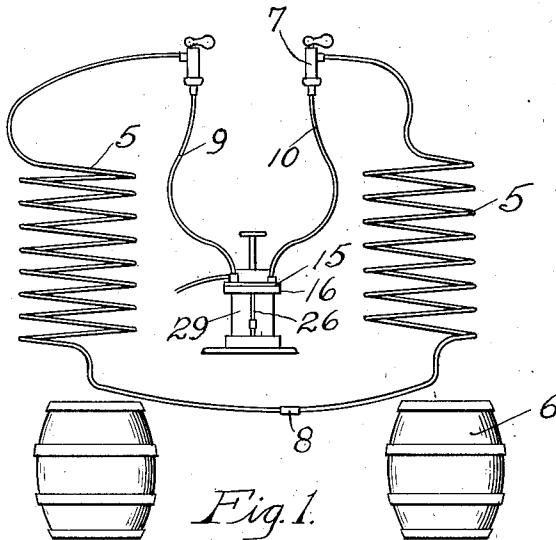


Fig. 1.

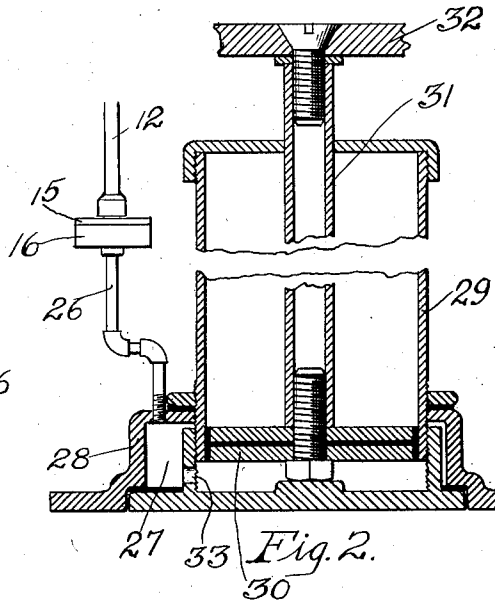


Fig. 2.

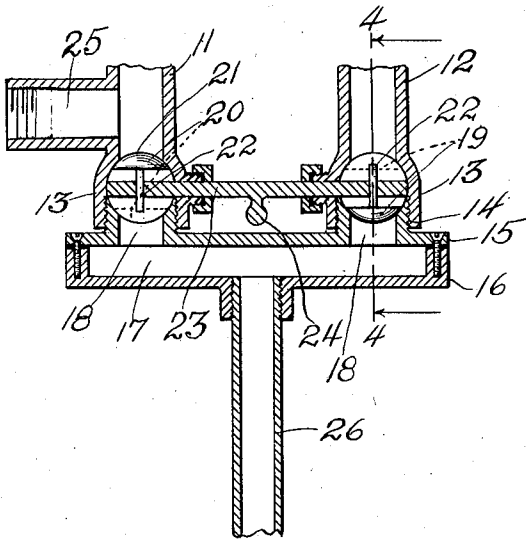


Fig. 3.

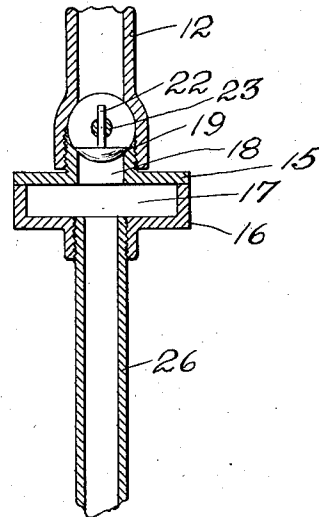


Fig. 4.

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APPARATUS FOR CLEANSING TUBES.

1,056,696.

Specification of Letters Patent.

Patented Mar. 18, 1913.

Application filed July 29, 1910. Serial No. 574,517.

To all whom it may concern:

Be it known that I, SAMUEL C. LAIDLEY, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Apparatus for Cleansing Tubes, of which the following is a specification.

This invention relates to a device for removing scale or sediment which accumulates upon the interior of the tubes, as, for instance, the coils which conduct beer from the keg to the faucet, although, of course, the device is not necessarily limited in its employment to coils which are used in connection with beer drawing, but, obviously, could be employed with any kind of coils or tubes where sediment will form in a manner to make its removal necessary.

The objects of the present invention are, to construct a device which is cheap and simple of manufacture; which is compact in form; and which contains no involved or delicate parts which would be likely to become disorganized.

Another object of the invention is to so arrange the device that a fluid of a chemical nature can be forced through the coils, and then a mixture of air and water forced through the coils, without any radical changes in the operative parts of the device other than the uncoupling of certain of its parts.

A further object is to arrange a reversal for the valve mechanism, whereby the chemical fluid can be forced first in one direction and then the other through the tubes.

Other objects will appear from a detailed description of the invention, which consists in the features of construction and combination of parts hereinafter described and claimed.

In the drawings, Figure 1 is a diagrammatic view, showing the device of the present invention in operative relation to a set of coils; Fig. 2 is a sectional elevation through the pump, showing the connection between the pump and the valve casing; Fig. 3 is a sectional elevation of the valve casing and the valve mechanism; and Fig. 4 is a section on line 4—4 of Fig. 3.

The device of the present invention is used in connection with tubes for conducting liquor, and, for illustrative purposes, is shown in connection with coils 5, which, as shown in Fig. 1, extend from a receptacle 6

to a faucet 7, and are used for the purpose of conducting liquid from said receptacle to the faucet. It is understood that in use one end of these coils is inserted into the receptacle, although in Fig. 1 the ends are shown withdrawn from the receptacle, since this is the position assumed when the cleaning device of the present invention is being operated.

The free ends of the coils, as shown in Fig. 1, are connected by a coupling 8, whereby a continuous passage is established between the two coils. Leading from the faucet 7 are tubes 9 and 10 which are secured to nipples 11 and 12, each enlarged at its lower end 13 and secured to necks 14 extending from a plate 15, which forms the upper plate of a valve casing 16. The valve casing is formed with a chamber 17, which is in communication with the passages in the nipples 11 and 12 through the medium of passageways 18 formed in the necks 14. Communication between the nipple 12 and the chamber 17 is controlled through the medium of a valve member 19, and communication between the nipple 11 and the chamber 17 is controlled by a valve member 20. Each of these valve members, as shown, is in the form of a convex disk 21, depending from which is a stem 22, and the stems are entered into a rod or bar 23, which is provided with a finger piece 24. This bar serves as a medium for reversing the position of the valves, the result of which reversal will hereinafter be more fully set forth.

Communicating with the nipple 11 is a passageway 25 which serves for conducting either a fluid of chemical mixture or water, as occasion may require. The valve casing is supported by a pipe 26, which enters a chamber 27 formed in a base 28, which base serves as a mounting for a cylinder 29, which contains a piston 30 actuated by a stem 31 connected to a handle 32; and communication between the chamber of the cylinder and the chamber 27 is had by means of a passageway 33 formed in the wall therebetween.

The operation is as follows: When it is desired to clean the coils, the ends of the tubes are removed from the keg and joined together, as shown in Fig. 1. The chemical solution is first forced through the coils, and during this operation the parts are as shown in full line Fig. 3, the chemical entering the passageway 25. When the piston 30 of the

pump is drawn upward, the suction created by such movement will open the valve 20 and permit the chemical to pass from the passage 25 into the chamber 17 of the valve casing; but this suction will at the same time tend to draw the valve member 19 closely down upon its seat, so that communication between the passage in the nipple 12 and the chamber 17 is cut off. When a reverse movement is imparted to the piston 30 the compression obtained thereby will act to unseat the valve member 19 and force the fluid, drawn into the chamber 17 by the previous action, into the nipple 12, from whence it will pass into the tube 10 and thence into the coils, and during this movement of the piston the pressure created thereby will tend to force the valve member 20 tighter into engagement with its seat, whereby communication between the chamber 17 and the nipple 11 is cut off. Hence, upon each upward movement of the piston, a certain amount of chemical solution will be drawn into the chamber 17, and upon each downward movement this amount will be forced through the nipple 12 and the tube 10 into the coils. Hence, a continuous passage of fluid will eventually be produced through the coils; thus the chemical can be forced through the coils a number of times and a small amount of chemical serve for a complete cleaning of the coils, the function of the chemical being only to cut the scale or sediment so that it will be more readily forced out of the coils when the water is forced thereinto. After the chemical has been forced through the coils in one direction a predetermined length of time, the operator may, if he desires, reverse the direction of flow through the coils by rotating the rod or bar 23. This will turn the valve members into the position indicated by dotted lines in Fig. 3, and in this position the upward movement of the piston will open the valve 19, and the downward movement open the valve 20, hence the fluid will be forced through the nipple 11 and the tube 9 into the coils and circulate through the coils and come out through the tube 10 and into the nipple 12, from whence it will be admitted into the chamber 17 of the valve casing, being directly the reverse of the operation hereinbefore mentioned.

When used in the manner above described the cleansing liquid will flow out through the pipe 9 connected to the nipple 11, instead of through the third conduit for water 25 because at such time said third conduit will be connected to a water faucet or hydrant by means of which it will be closed. In other words the cleansing mechanism of the present invention is intended to be used at times in conjunction with an ordinary hydrant having a water faucet, which faucet will serve to close the third conduit for

water 35 thereby directing the flow of cleansing fluid out through the pipe 9 as long as said faucet is closed.

After the chemical has been forced through the coils a suitable length of time, water is admitted through the passageway 25 flowing with the proper speed and in the proper quantity for an efficient operation of the device, and the valve members are turned into the position shown in dotted lines in Fig. 3. The tube 10 is then uncoupled from the faucet 7 and the nipple 12, so that the passageway through the nipple 12 communicates directly with the outside air. Then, as the piston 30 is moved upward, a charge of air will be drawn into the chamber 17 by this action, and upon the downward movement of the piston this air will be forced into the nipple 11 and will force a certain amount of water coming out of the passageway 25 ahead of it into said nipple, from whence it will pass into the tube 9 and circulate through the coils and eventually be discharged into the open through the end of the faucet 7 to which the tube 10 had formerly been connected. During this operation the body of water in the passage 25 will serve to prevent the air escaping through the channel, although the pressure of the air will be sufficient to prevent the downward flow of the water when the valve is opened; it will not be sufficient to force itself against the body of water coming through the passage 25 but will follow the course of least resistance and flow through the pipe 9 into the coils and out through the open end of the faucet 7. Of course, the water will not be discharged at the first operation of the pump, but several operations will have to be gone through with before sufficient water will be forced into the coils to circulate entirely therethrough and reach the faucet 7. During this operation there will be a mixture of air and water in the coils, consisting of a quantity of water and then a quantity of air, this air being maintained throughout the column which is extending through the coils. This is deemed to be a very essential point in the present invention, as the air, in passing through the coils, will expand and thus force the water ahead of it, thus circulating the water through the coils under pressure, whereby a more efficient removal of the scale or sediment which has been loosened by the chemical will take place than would occur if the water were merely passed through the coils without any accompanying pressure. It is obvious that a continuous expansion of air will take place as it passes through the coil since the air is constantly being forced toward the open end of the faucet 7 and hence the length of the column of water resting above the air is constantly growing less; hence the air will constantly and gradually expand during its

travel through the coils, since the pressure above it will be constantly decreasing. Of course, during the operation of forcing the water through the coils, no reversal of the flow of the liquid is possible, since there is only communication between the valve mechanism and the coils through the medium of the tube 9. As shown in Fig. 2, the pipe 26 serves the double function of a means of communication between the chambers 27 and 17 and of a support for the valve casing.

I claim:

1. In a device of the class described, the combination of an air pump, a chambered receptacle for fluid, a connection between the compression chamber of the pump and the chamber of the receptacle, valve mechanism controlling communication between the source of fluid supply and the chamber of the receptacle, valve mechanism controlling communication between the chamber of the receptacle and a tube, the pump, when actuated in one direction, establishing communication between the chamber and the source of fluid supply, and, when actuated in the opposite direction, establishing communication between the chamber and the tube, whereby the fluid is forced through the tube, and a rod connecting the valve members, the turning of the rod serving to reverse the position of the valve members, whereby a reversal of flow of the liquid is effected, substantially as described.

2. In a device of the class described, the combination of an air pump, a chambered receptacle, a connection from the pump to the chamber of the receptacle, a valved inlet conduit to said receptacle, a valved outlet conduit from said receptacle, and a third conduit for water communicating with the outlet conduit beyond the valve therein, substantially as described.

3. In a device of the class described, the combination of an air pump, a chambered receptacle, a connection from the pump to the chamber of said receptacle, a conduit for water, a connection from the chamber of said receptacle to the conduit for water, an outlet conduit communicating with said connection, an inlet conduit leading to the chamber of the receptacle, a valve in the inlet conduit, and a valve interposed in the connection leading from the chamber of the receptacle to the conduit for water, substantially as described.

4. In a device of the class described, the combination with a compression mechanism, of a conduit for water, an inlet conduit for air, an outlet conduit, a connection from the inlet conduit to the conduit for water and the outlet conduit, a tube establishing communication from said connection to the compression mechanism, a valve interposed between the inlet conduit and the compression

mechanism, and a valve interposed between the compression mechanism and the conduit for water, substantially as described.

5. In a device of the class described, the combination with a compression mechanism of a chambered receptacle, inlet and outlet conduits communicating with said receptacle, a third conduit for water communicating with one of said conduits, a valve in said last mentioned conduit between the third conduit for water and the chambered receptacle, a valve in the other conduit, a connection from the chambered receptacle to the compression chamber of the compression mechanism and means for supporting said chambered receptacle, substantially as described.

6. In a device of the class described, the combination with a compression mechanism, inlet and outlet conduits, a connection from both of said conduits to the compression mechanism, a third conduit for water communicating with one of said conduits, a valve located in said last mentioned conduit between the third conduit for water and the connection to the chambered receptacle, a valve located in the other conduit, and means for simultaneously reversing the action of both of said last mentioned valves, substantially as described.

7. Pipe cleaning apparatus, comprising a suction and pressure pump having a valved inlet conduit and a valved outlet conduit, a third conduit for water communicating with the outlet conduit beyond the valve therein, and couplings for each conduit, substantially as described.

8. Pipe cleaning apparatus comprising a force pump having a valved inlet conduit and a valved outlet conduit, a third conduit for water communicating with the outlet conduit beyond the valve therein, and couplings for each conduit, substantially as described.

9. Pipe cleaning apparatus comprising a pump having a pair of valved conduits in communication with its cylinder, a third conduit for water communicating with one of the conduits beyond the valve therein, and means for reversing the positions of the valves in the conduits, substantially as described.

10. Pipe cleaning apparatus comprising a force pump having two valved conduits in communication with its cylinder, means for simultaneously reversing the positions of the valves of said conduits, and a third conduit for water communicating with one of said valved conduits beyond the valve therein, substantially as described.

11. Pipe cleaning apparatus comprising a valved outlet conduit, a third conduit for water communicating with said conduit beyond the valve therein, and means for intermittently forcing bodies of air through said

conduit, and through the valve thereof to cause said bodies to break into the stream of water flowing into the conduit from the third conduit, substantially as described.

- 5 12. Pipe cleaning apparatus comprising a delivery conduit, means for directing a stream of water from said conduit, and means for forcing bodies of air to break

into said stream for the purpose of causing an intermittent flow of water and air from 10 said conduit, substantially as described.

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