

March 5, 1935.

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1,993,371

PORTABLE CONDUIT COIL CLEANER APPARATUS

Filed Aug. 14, 1933

3 Sheets-Sheet 1

Fig. 1.

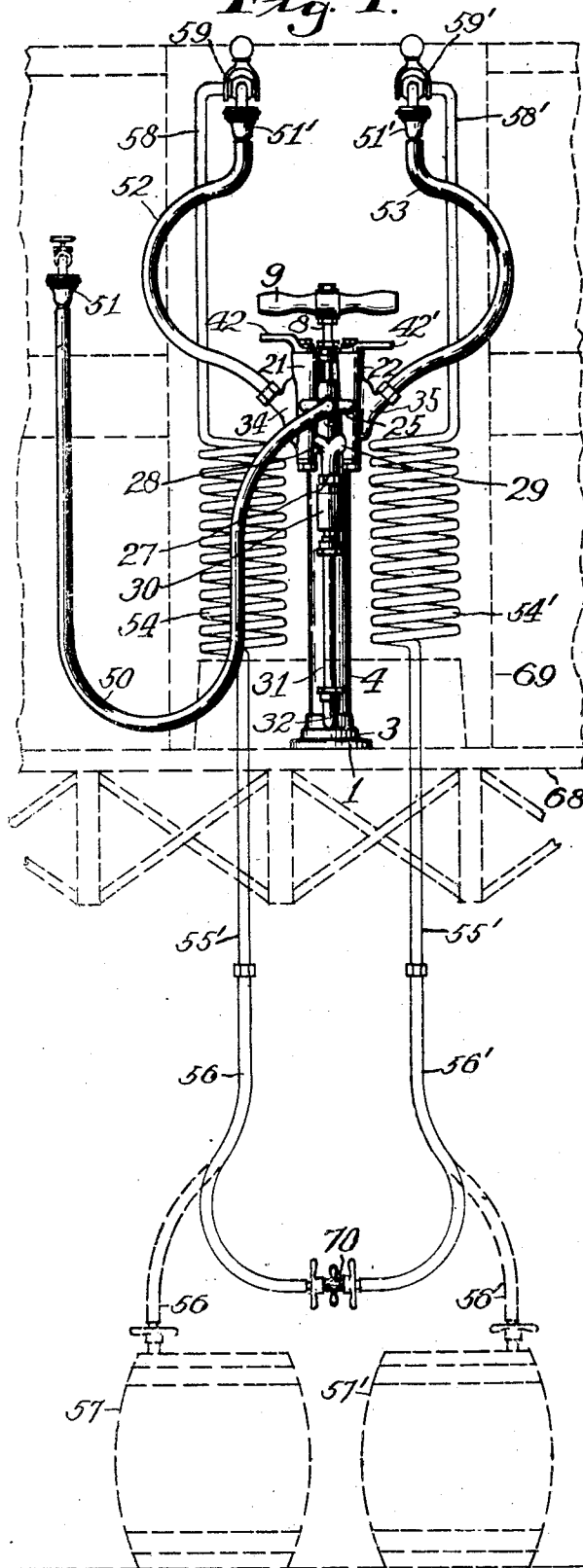


Fig. 2.

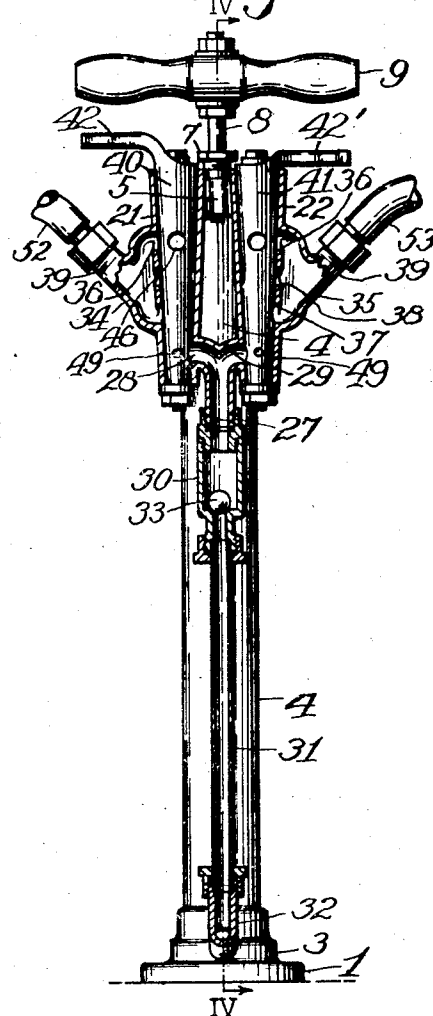
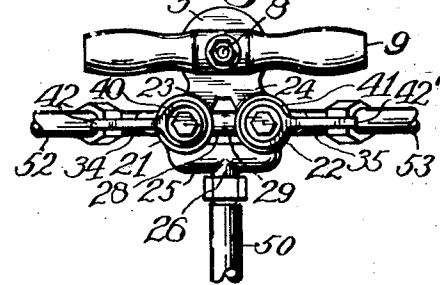


Fig. 3.



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3 Sheets-Sheet 2

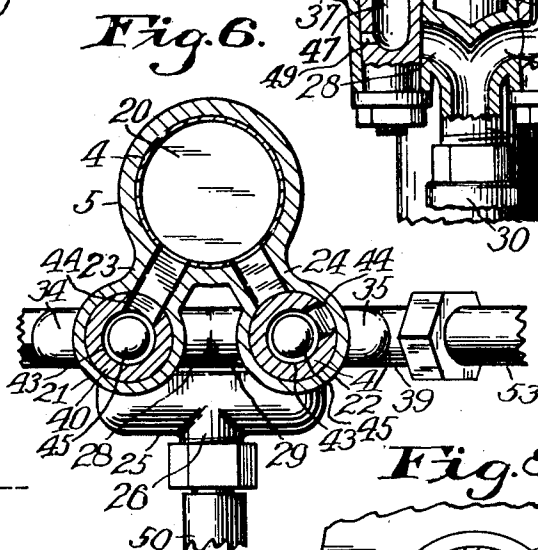
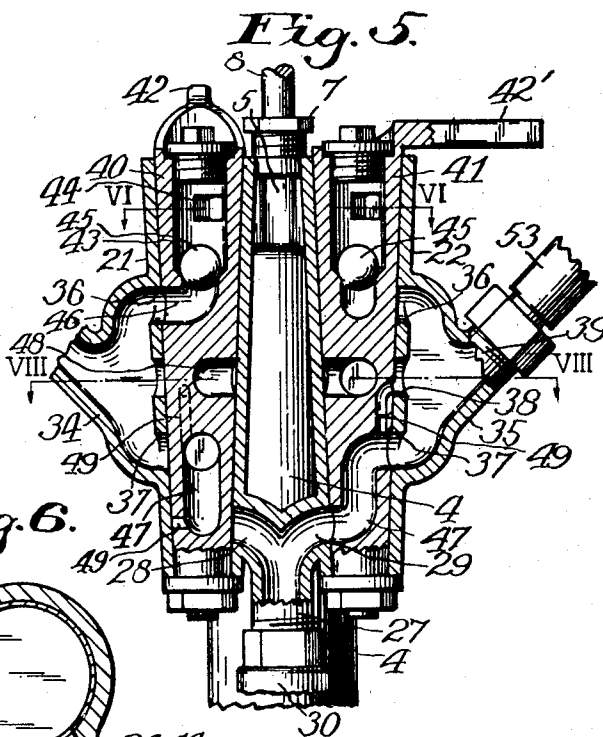
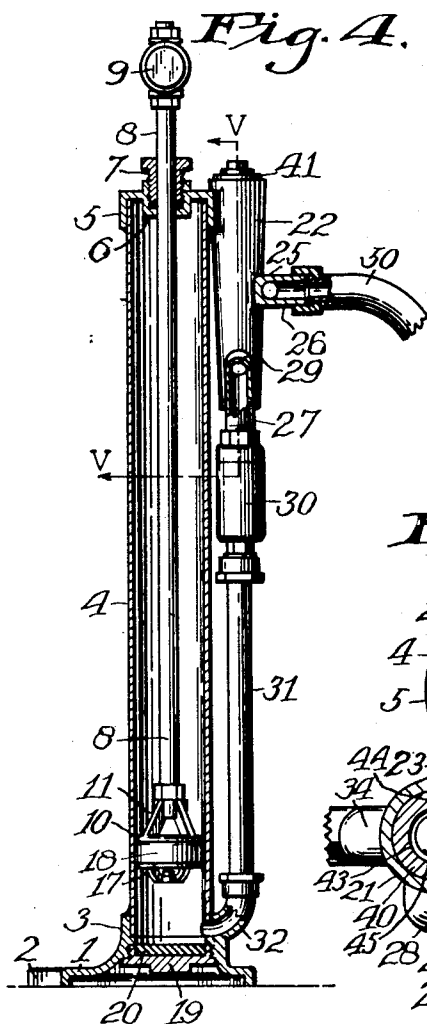
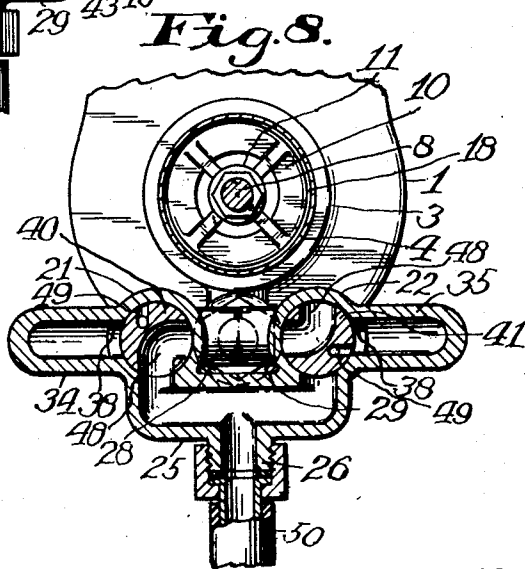
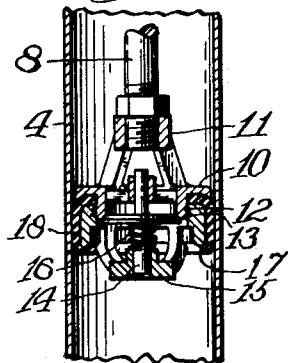


Fig. 7.



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Fig. 9.

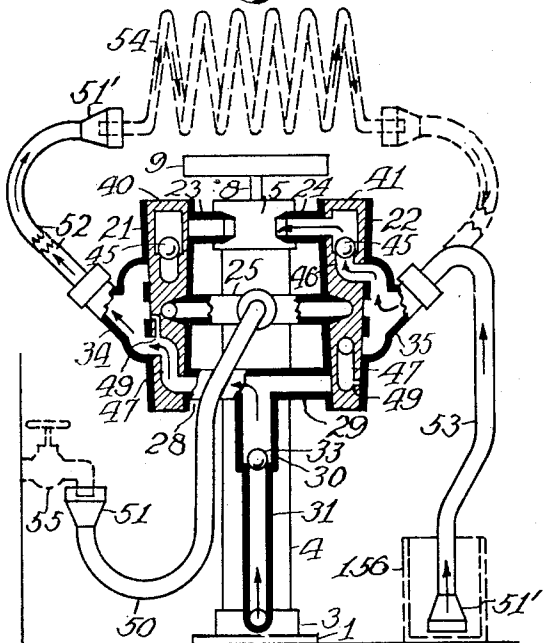


Fig. 10.

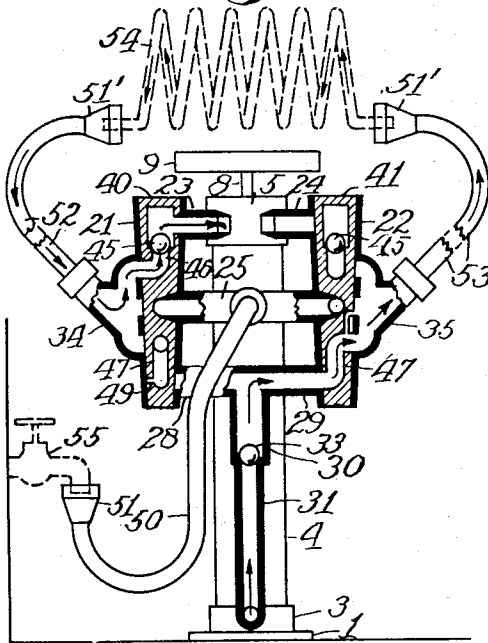


Fig. 11.

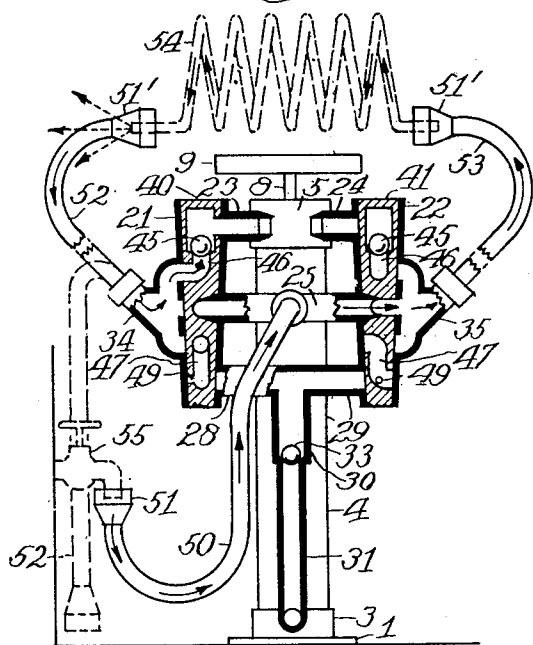
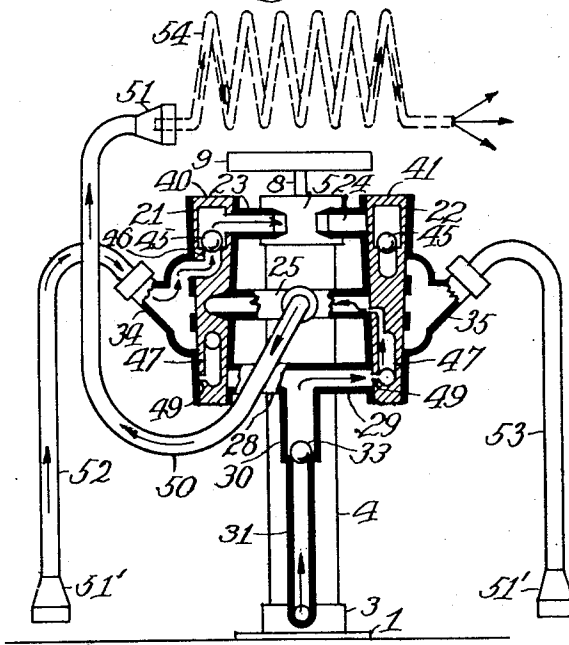


Fig. 12.



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UNITED STATES PATENT OFFICE

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PORTABLE CONDUIT-COIL CLEANER
APPARATUS

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Application August 14, 1933, Serial No. 685,142

11 Claims. (Cl. 225—12)

This invention relates to means for cleaning the inside of conduits or conduits coils, especially such as are commonly used for conducting beer or other beverages, or in which liquids may be changed in temperature to suit requirements incidental to dispensing thereof, the invention having reference more particularly to apparatus for controlling a liquid cleaner such as a chemical or a solvent composition and so as to cause the cleaner to violently flow to-and-fro in the conduit required to be cleaned, the apparatus being of a portable nature and such as to be manually operated and controlled.

An object of the invention is to provide a conduit coil cleaner apparatus which shall be so constructed as to be adapted to be repeatedly used in a simple and inexpensive manner to control and expedite action of a liquid cleaner so as to restore the usefulness and efficiency of a conduit or a cooling coil, and which shall not be liable to serious deterioration nor be costly in maintenance.

Another object is to provide improved apparatus which shall be so constructed as to be adapted to be connected to a conduit at different portions thereof and to control flow of a liquid cleaner therethrough, and which shall be of inexpensive construction and simple in operation.

A further object is to provide an efficient portable apparatus which shall be so constructed as to be adapted to be hand-operated and readily connected to a conduit coil for controlling the flow of a liquid cleaner therein to facilitate the cleaning action of a liquid cleaner on the inside of the conduit coil, which apparatus shall be adapted to be of light-weight and easy operation and of few and substantial parts so as to be durable and economical in use.

With the above-mentioned and other objects in view, the invention consists in a novel circulating-pump provided with variously arranged directional flexible conduits and adjustable means to control flow through the conduits to effect forcible to-and-fro surging of a liquid cleaner in a conduit, the flexible conduits being readily connectable to different portions of the coil or a conduit to be cleaned; and further, the invention consists in the parts and combinations and arrangements of parts, as hereinafter particularly described and claimed.

Referring to the accompanying drawings,—Figure 1 is an elevation of a preferred construction of the apparatus illustrated as being suitably connected with a plurality of beer coils shown by broken lines and connected with beer kegs and

in arrangement to be cooled so as to deliver cooled beverages to be dispensed; Fig. 2 is an elevation with parts in section of the improved circulating-pump comprised in the invention on an enlarged scale; Fig. 3 is a top plan of the circulating-pump; Fig. 4 is a vertical section of the circulating-pump on a plane at right angles to Fig. 2 or approximately on the line IV—IV thereon; Fig. 5 is a further enlarged section of the upper portion of the circulating-pump on a line corresponding to the line V—V on Fig. 4; Fig. 6 is a fragmentary horizontal section on a plane corresponding approximately to the plane of the line VI—VI on Fig. 5; Fig. 7 is a fragmentary vertical section of a portion of the circulating-pump cylinder and a piston in section therein; Fig. 8 is a fragmentary horizontal section approximately on the plane of the line VIII—VIII on Fig. 5; and Figs. 9, 10, 11 and 12 are vertical views of a diagrammatic nature illustrating the apparatus differently connected with a conduit coil and various positions of parts of the apparatus to variously control flow of the liquid cleaner in the operations of cleaning a conduit coil illustrated by broken lines.

Similar reference characters in the different figures of the drawings indicate corresponding elements or features of constructions herein referred to in detail.

In one form of construction which may be preferable, the circulating-pump has a suitable base 1 having an extension 2 adapted to be held to a floor by the feet of an operator, the base having a boss 3 on its top to which a pump cylinder 4 is secured, the top of the cylinder having a head 5 fixed thereto which is provided with a packing-box 6 and a suitable packing gland 7 through which a pump rod 8 extends to be manually operated by means of a handle 9 to cause reciprocatory movement of a piston in the cylinder which comprises a head 10 provided with a spider 11 which is secured to the rod 8 and affording passage through the head 10 which is provided with an annular valve seat ring 12 on its under side and on which a disk valve 13 normally is seated and having a guide stem 14 arranged in a spider head 15 which supports a spring 16 yieldingly holding the valve to its seat, the spider having a base ring 17 secured to the seat ring 12 of the piston and holding a cup packing ring 18 in place against the wall of the cylinder. The base 1 has a metallic bottom 19 to constitute a lower cylinder head and a cushion 20 thereon against which the piston may be stopped after downward motion.

Two control valve casings 21 and 22 are mounted

on one side of the cylinder and have support by the head 5 and a lateral projection thereon having ports 23 and 24 that are connected with the casings respectively, and a hollow yoke 25 is connected to the middle portions of the casings and has a conduit neck 26 intermediate of its ends. A connector pipe 27 is arranged between the lower portions of the casings and has branches 28 and 29 that are connected with the casings respectively; a valve cage 30 is connected with the lower end of the pipe 27 and has a conduit pipe 31 connected therewith that extends downward and is connected to an elbow 32 which affords communication with the lower portion of the cylinder 4, being a part of the base of the cylinder, and the cage 30 has a gravity check valve 33 therein operating to prevent downward flow to the pipe 31. The casings have chests 34 and 35 thereon respectively and each casing wall has a port 36 affording communication with the upper portion of the adjacent chest, a similar port 37 at the lower portion of the chest and a port 38 intermediately of the other ports. Each chest has a neck 39 for connection of a conduit therewith. The valve casings have tapered control valves 40 and 41 therein respectively that are provided with handles 42 and 42' respectively and each has a valve chamber 43 in its upper portion from which a port 44 extends to afford communication with the port 23, the chamber having a gravity action check valve 45 to operate on its bottom from which extends a channel 46 which may be registered with the port 36 upon adjustment of the valve, the valve 41 being likewise equipped. The lower portion of each valve has a channel 47 having one end to register with the port 37 and its opposite end to register with one of the branches of the connector pipe 27 upon appropriate movement of the valve. Each valve also has a gate 48 which may be registered with the yoke 25 and the port 38 and has also a by-pass 49 through which air may pass on various adjustments of the control valve.

A flexible conduit 50 is connected to the neck 26 and has a connector 51 on its end suitably equipped to be connected to the end of a pipe or similar article. Similar flexible conduits 52 and 53 are connected to the necks of the chests 34 and 35 respectively and are each provided on its end with a connector 51' adapted to connect the conduit with opposite ends respectively of a conduit coil 54 or elsewhere if it may be desired, as to a faucet 55.

In explanation of the uses of the apparatus two cooling coils 54 and 54' are indicated by broken lines and have each a conduit pipe 55' connected therewith to lead downward into proximity of a supply of beer which may be in a cellar, a flexible conduit 56 being connected to the end of one of the pipes and a similar conduit 56' being connected to the end of the other pipe and are connected to beer kegs 57 and 57' respectively, the upper ends of the coils having conduit pipes 58 and 58' connected thereto respectively and leading to faucets 59 and 59' respectively. Usually the pipes pass through a floor 68 and into a cooling box 69 in which the coils and other parts of the conduits may be packed in ice. Suitably the circulating-pump may be supported on such floor and when cleaning the coils and other parts of the conduit and also the faucet or either one of the coils separately the flexible conduits 56 and 56' may be disconnected from the beer kegs and their ends brought together and connected one to the other by means of a suitable coupler 70, which is

especially desirable when the conduits 52 and 53 are connected with opposite ends of the coil or a conduit to afford continuity of circulation therethrough. Each connector 51, 51', being constituted to be tightly pushed onto a smooth pipe end or a discharge spout and constitute a conduit connection therewith, or to be placed in a vessel 156 to receive a cleaner which may comprise any suitable chemical solution desired to be conducted by the flexible conduit to the coil or conduit to be cleaned.

In practical use the circulating-pump is placed upon a floor and steadily held in place by the operator's feet or a foot while the handle 9 is grasped by hand and the piston operated in a reciprocatory manner. The arrows on the different conduits in the different figures of the drawings indicate the direction of movement or flow of liquid consequent upon operation of the piston and appropriate adjustment of controlling valves 40 and 41 so as to cause violent or forceful flow of the cleaner, air that may be found in a coil at first escaping through a conduit and replaced by the cleaner through another flexible conduit. When water is desired in the cleaner mixture the same may be obtained upon connection of the conduit 50 with a water supply faucet 55. In Fig. 11 arrows indicate the direction of flow of air from the conduit 54 and through the conduit 52 and the valve 40 to pass into the upper portion of the pump cylinder. The surging of the liquid cleaner in the coils or conduit loosens sediment or other matter therein which may be blown out as indicated in Fig. 12 through one end of the coil as indicated by arrows in Fig. 12 upon disconnection of the conduit 53 from the end of the coil, leaving the conduit in clean condition for further use.

What is claimed is:

1. A conduit-coil cleaner apparatus having a vertical pump cylinder and a piston operable therein, two control valve casings connected together and with the opposite ends of the cylinder, flexible conduits connected with the casings respectively, a yoke connected with the casings, a flexible conduit connected with the yoke, a plurality of connectors carried by said conduits respectively, and means to control passage through said casings and said conduits.

2. A conduit-coil cleaner apparatus having a vertical cylinder and a ported piston operable therein, the piston being provided with a valve automatically seated upon descent of the piston to close passage therethrough, a plurality of flexible conduits having means to connect them to a conduit-coil, and manually-controlled means for effecting communication between the lower and upper portions of the cylinder and the flexible conduits, said conduits being co-operatively associated with the cylinder.

3. A conduit-coil cleaner apparatus having a vertical cylinder and a piston operable therein, two valve casings fixed to the cylinder and having communication with the upper portion of the cylinder, a hollow yoke having communication with the casings, a flexible conduit connected with the yoke, a main conduit connected with the cylinder adjacent to the lower end thereof and having branches connected with the lower portions of the casings respectively, the main conduit having a gravity-action check-valve therein, two flexible conduits having connection with the valve casings respectively, and manually controlled valve means in each of the valve casings

operable to co-operatively control flow upward therethrough and in the flexible conduits.

4. A conduit-coil cleaner apparatus having a circulating-pump comprising a vertical cylinder and two valve casings on one side of the cylinder, having each a chest thereon, the cylinder having a head on its top provided with a packing-box and provided with two ports communicating with the upper portions of the valve casings respectively and with the cylinder below its head, the cylinder having a bottom closure, a piston in the cylinder having a rod extending through said packing-box and having a valve therein opening on upward stroke of the piston, a pipe connected with the lower portion of the cylinder and having branches connected with the valve casings respectively, the pipe having a gravity-action check-valve therein, a hollow yoke connected with the two valve casings and a flexible conduit connected to the yoke, two flexible conduits connected to said chests respectively, and two manually-operable key-valves in the casings respectively and each having gates therein to afford communication between one of said ports and one of said chests and said yoke, one of said gates in each key-valve having a gravity-action check-valve therein.

5. In a conduit-coil cleaner apparatus, the combination of a vertical pump cylinder, two valve casings mounted on one side of the cylinder and provided each with a port to connect it with the upper portion of the cylinder, each casing having a communication chest thereon, a conduit pipe connected with the lower portion of the cylinder and having branches connected with the casings respectively, a yoke connected with both of the casings and having a conduit connected therewith, and a piston operable in the cylinder and having a downward-opening valve.

6. In a conduit-coil cleaner apparatus, the combination of a plurality of control valve casings correlated one with another and having each a flexible conduit connected therewith to be connected with a conduit-coil, a circulating-pump having a pipe connection at its bottom with the lower portion and port connections at its top with the upper portions of the casings, the pipe connection being provided with a gravity-action check-valve, a hollow yoke connected with each of the casings, a flexible conduit connected with the yoke and having a connector on its end, and manually controlled channelled rotatively adjustable devices arranged in the casings respectively to control flow variantly therein.

7. In a coil-cleaning device having a reciprocating-piston pump, a pair of conduits each adapted for connection to the end of a coil, and a conduit for connection to a water supply, the combination of a passage to the pressure side of the pump, and valve means adapted to effect

any two of the following connections; said water conduit with either of said coil conduits, said pressure passage with any of said conduits, and either of said coil conduits with the suction side of said pump.

8. In a coil-cleaning device having a reciprocating-piston pump, a pair of conduits each adapted for connection to the end of a coil, and a conduit for connection to a water supply, the combination of a passage to the pressure side of the pump, a pair of independently operable valve means each having a first position providing communication between one of said coil-conduits and the suction side of said pump, a second position providing communication between one of said coil-conduits and said pressure passage, a third position providing communication between said water conduit and one of said coil conduits, and a fourth position providing communication between said pressure passage and said water conduit.

9. In a coil-cleaning device having a reciprocating-piston pump, a pair of conduits each adapted for connection to the end of a coil, and a conduit for connection to a water supply, the combination of a passage to the pressure side of the pump, a pair of independently operable valve means each having a first position providing communication between one of said coil-conduits and the suction side of said pump, a second position providing communication between one of said coil-conduits and said pressure passage, and a third position providing communication between said water conduit and one of said coil conduits.

10. In a coil-cleaning device having a reciprocating-piston pump, a pair of conduits each adapted for connection to the end of a coil, and a conduit for connection to a water supply, the combination of a passage to the pressure side of the pump, each of said coil-conduits having associated with it an independently operable valve means arranged to connect it either to said pressure passage, said water conduit, or the suction side of said pump.

11. In a conduit-coil cleaner, a pair of flexible conduits adapted to be connected to the ends of a conduit-coil, and means interconnectable with said flexible conduits to form a closed circuit with said conduit-coil and effect a forced circulation of fluid around said circuit, said means comprising a pump casing, a piston reciprocable therein and provided with a check valve, and means for connecting the suction and pressure ends of said pump casing respectively to said flexible conduits and including a check valve openable in the opposite direction of fluid flow from said piston check valve.

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