

June 18, 1940.

LE ROY D. LOWRY

2,204,900

APPARATUS FOR CLEANING COILS

Filed Feb. 17, 1937

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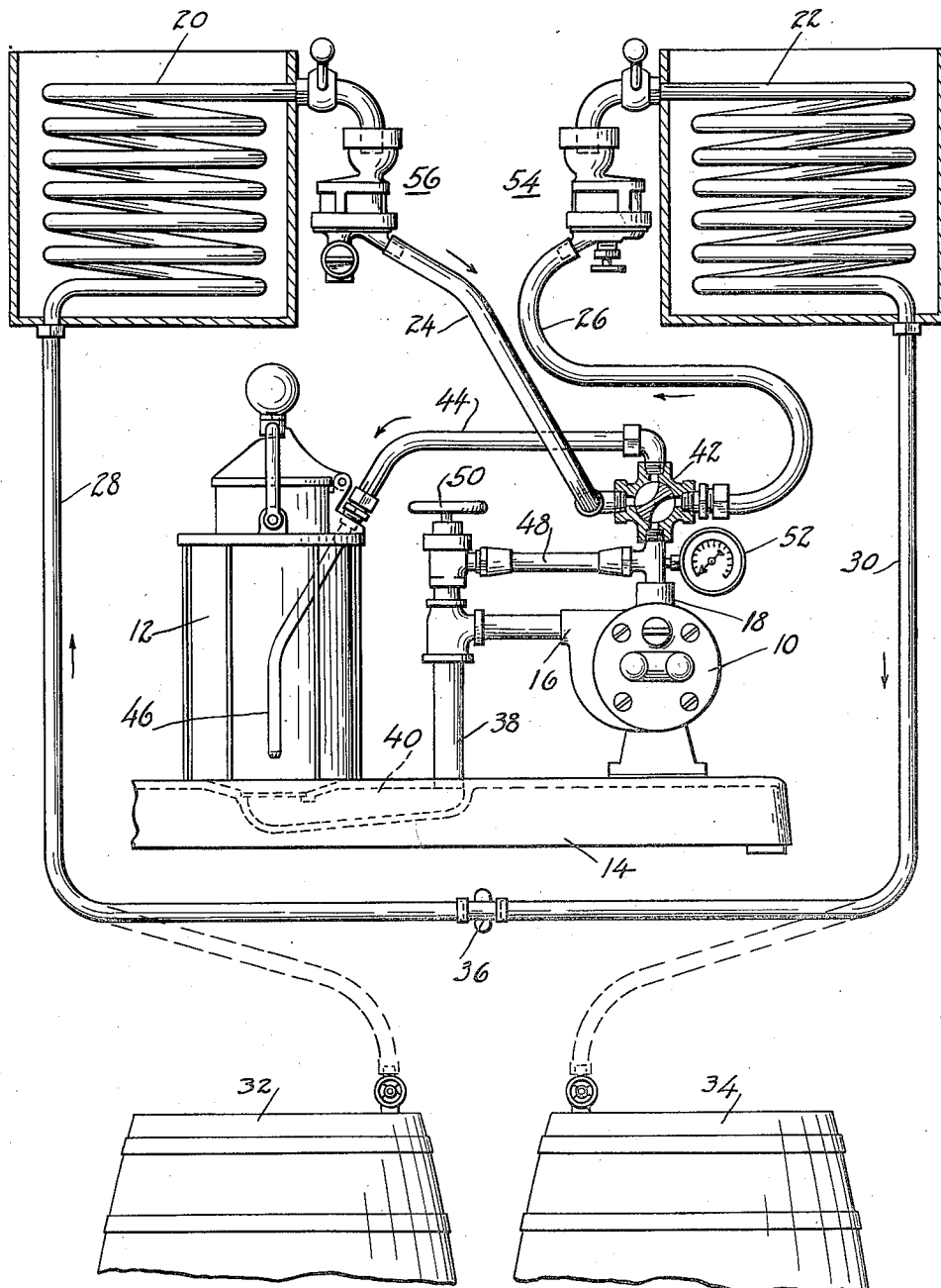


Fig. 1

INVENTOR.

LEROY D. LOWRY

BY

Parker & Barton
ATTORNEYS

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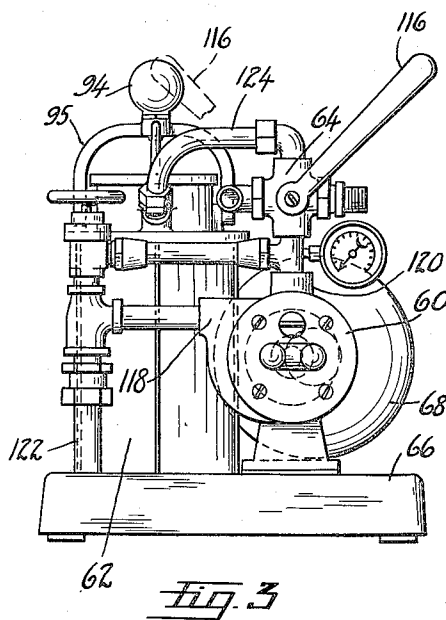
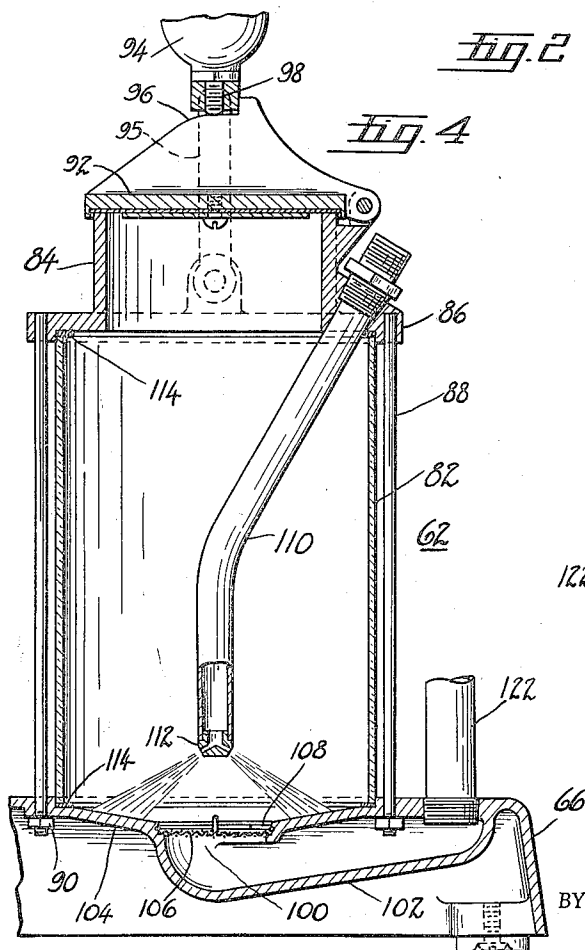
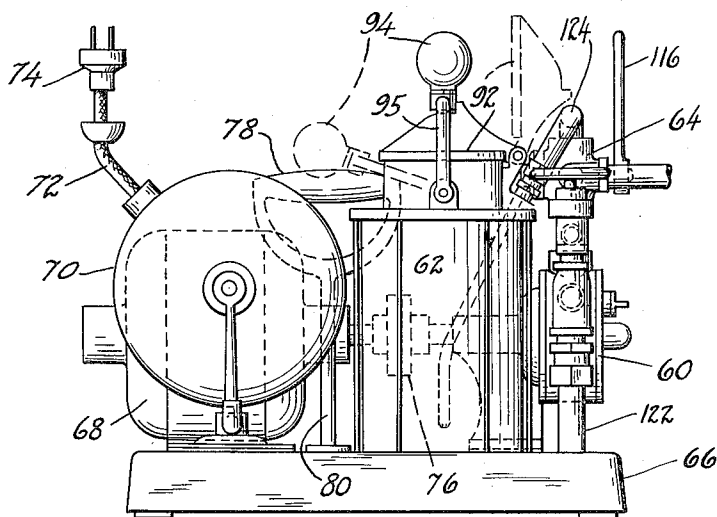
LE ROY D. LOWRY

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4 Sheets-Sheet 2



INVENTOR,
LEROY D. LOWRY
BY *Parker & Burton*
ATTORNEYS.

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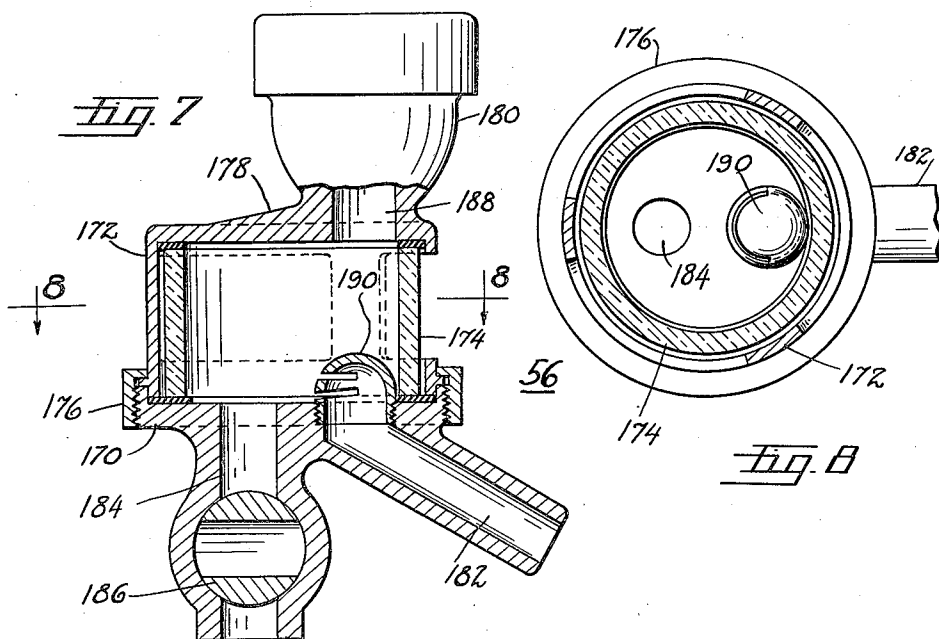
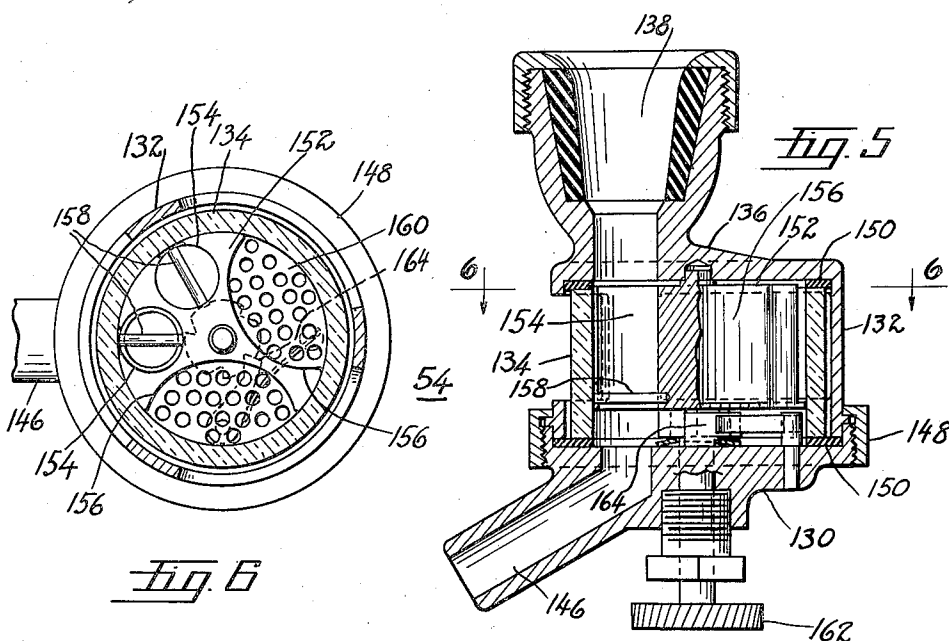
LE ROY D. LOWRY

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INVENTOR,
LEROY D. LOWRY
 BY *Parker & Burton*
 ATTORNEYS.

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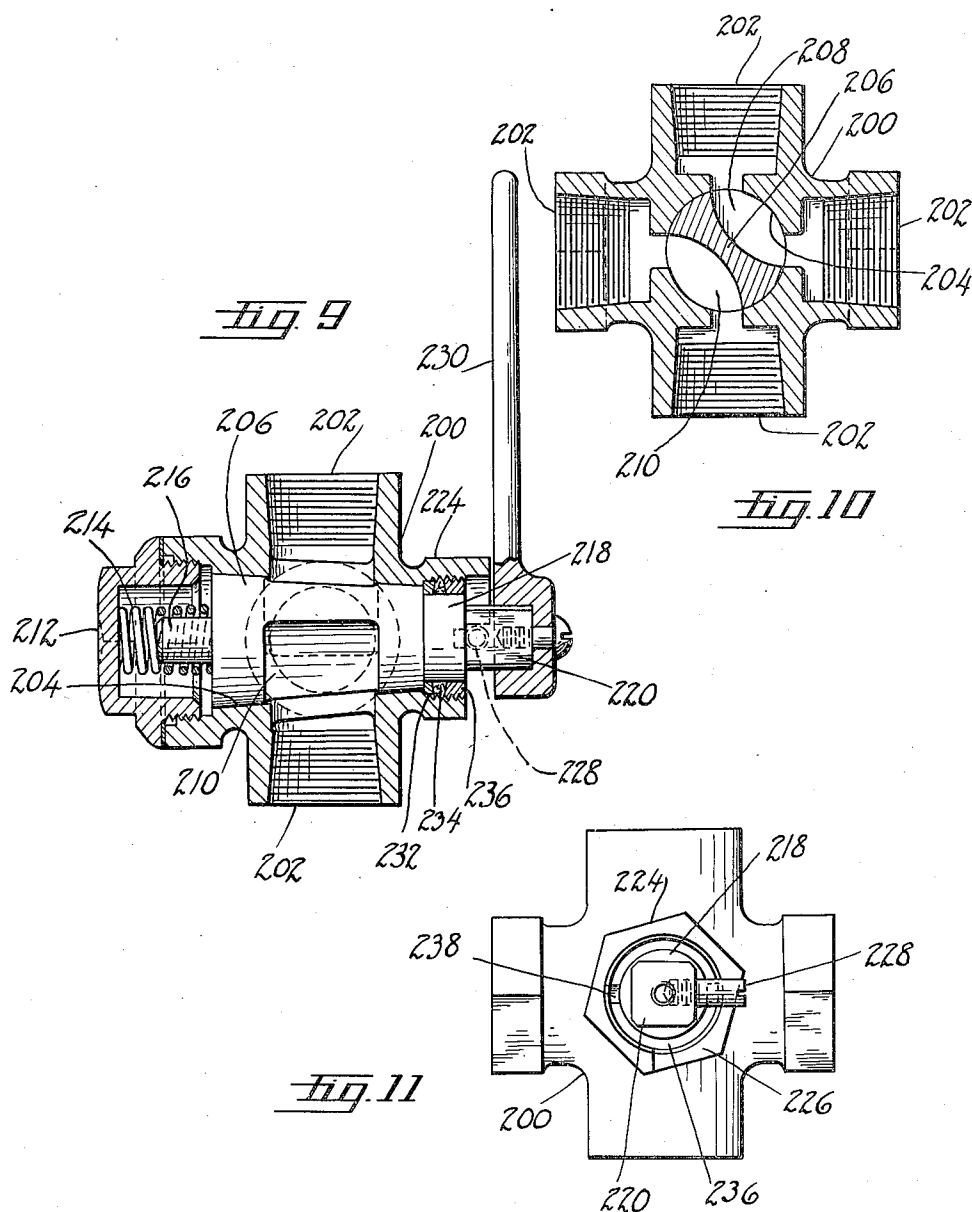
LE ROY D. LOWRY

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APPARATUS FOR CLEANING COILS

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4 Sheets-Sheet 4



INVENTOR,
LEROY D. LOWRY
BY
Parker & Burton
ATTORNEYS.

UNITED STATES PATENT OFFICE

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APPARATUS FOR CLEANING COILS

Le Roy D. Lowry, Detroit, Mich.

Application February 17, 1937, Serial No. 126,293

7 Claims. (Cl. 225-12)

This invention relates to improvements in apparatus for cleaning pipe lines such as beer coils.

This invention relates to improvements in the type of apparatus shown in my patents, Nos. 2,015,566 and 2,015,567. In these patents the apparatus illustrated therein included a fluid pump, a liquid detergent mixing tank and branched conduits for connecting the pump and tank to a beer coil so as to provide a closed system through which the fluid discharged by the pump is circulated. Suitable valves are provided for controlling the fluid flow and the mixing operations in the tank. In my later filed Patent, No. 2,015,567 I have shown sponge loading and extracting mechanisms which are capable of feeding cleaning sponges or other types of swabbing elements into one end of a coil and extracting the same from the other end of the coil without interrupting the flow of fluid through the circulatory system.

My present invention relates to improvements in the type of apparatus disclosed in these patents and more particularly to improvements in the apparatus shown in my later filed Patent, No. 2,015,567. An important object of this invention is to provide a compact, light, portable apparatus for cleaning coils including improvements which are capable of circulating the cleaning fluid first in one direction through the coil and then in the other direction without interrupting the action of the pump. Included with this apparatus is a novel valve control device which is adapted to reverse the movement of the cleaning fluid through the coil to which the apparatus is attached but at the same time permit the fluid pressure developed by the pump to continuously flow in one direction through the detergent mixing tank irrespective of the changes in the direction of the flow of fluid through the coil being cleaned. In combination with a valve control device of this character the apparatus includes improved mechanisms at either end of the coil being cleaned which are adapted to both introduce and extract sponges from the cleaning fluid without interrupting the circulation of the cleaning fluid. This enables the apparatus to obtain a distinctly new result, namely, that of passing one or more cleaning sponges back and forth through the coil thus economizing in the time and in the number of sponges which are required for each cleaning operation.

A meritorious feature of the invention is the fact that the most important steps of the cleaning operation can be viewed by the operator and any others interested in the procedure. This is

accomplished by the provision of glass parts wherever such is feasible. In the present invention, the detergent mixing tank is provided with a cylindrical wall of glass which permits the operator to view the mixing operations. Both the devices which are connected to the opposite ends of a coil for introducing and extracting cleaning sponges from the fluid system have glass parts which enable one to witness the action of these devices. This assists the operator in controlling the travel of the sponges in the coil for it is by reason of these glass portions that he can tell when the sponges have completely passed through the coil and are ready to be returned by reversing the flow of fluid therethrough. Thus the important steps in the cleaning operation can be observed and the degree to which the coil is cleaned readily perceived.

Other objects, advantages and meritorious features of this invention will appear more fully from the following specification, appended claims and accompanying drawings, wherein,

Figure 1 is a diagrammatic illustration of the apparatus involving my invention,

Fig. 2 is a side view of an apparatus having the various elements thereof mounted upon a single base for portability,

Fig. 3 is an end view of the apparatus shown in Fig. 2,

Fig. 4 is a detail cross-sectional view of a detergent mixing tank,

Fig. 5 is a cross-sectional view of an improved sponge injecting device,

Fig. 6 is a cross-sectional view along lines 6-6 of Figure 5,

Fig. 7 is a cross-sectional view of an improved sponge extracting device,

Fig. 8 is a cross-sectional view along line 8-8 of Figure 7,

Fig. 9 is a side cross-sectional view of the four-way valve showing the manner of packing the same to prevent leakage,

Fig. 10 is a cross-sectional view through the center of the four-way valve at right angles to the view in Fig. 9,

Fig. 11 is an outside view of the four-way valve.

The apparatus illustrated herein comprises primarily a fluid pump, a detergent mixing tank, conduits for connecting pump and tank to a coil to be cleaned, and a valve control mechanism which is adapted to circulate the fluid pressure of the pump back and forth through the coil during the cleaning operation. Associated with this apparatus and co-operating with the rever-

sals of fluid flow through the coil are sponge injecting and extracting mechanisms which are adapted to both introduce and remove the cleaning sponges from the coil without interrupting the flow of fluid pressure through the entire system. An apparatus embodying this invention is diagrammatically shown in Figure 1 with the non-essential members thereof removed for clarity. In Figures 2 and 3 a complete apparatus especially adapted for portability is shown with all the necessary elements for the cleaning operation assembled upon a movable base.

Referring in more detail to the drawings and particularly to Figure 1, a fluid pump 10 and a detergent mixing tank 12 are supported upon a base 14. In the apparatus illustrated herein, the inlet to the pump is indicated at 16 and the outlet thereof at 18. The apparatus is shown associated with a pair of coils 20 and 22 which, in this particular instance, are beer coils. Appropriate flexible conduits 24 and 26 connect the pump and tank with the coils 20 and 22 respectively. In normal use these coils communicate by means of conduits 28 and 30 with beer kegs 32 and 34 respectively shown at the bottom of Figure 1. For cleaning operations, conduits 28 and 30 are usually joined together by any suitable coupling 36 so that a complete circulatory fluid system including the coils, the pump and the tank is provided.

The inlet 16 of the pump communicates by way of pipe 38 and 40 with the bottom of the detergent tank 12. The outlet 18 of the pump communicates with a four-way valve structure 42. A pipe 44 leads from the opposite side of the four-way valve 42 to the detergent tank and a delivery pipe 46 discharges fluid into the bottom of the tank. Conduits 24 and 26 which lead to the coils 20 and 22 respectively open into the remaining ports of the four-way valve 42. A by-pass 48 around the pump is valve-controlled at 50 to regulate the pressure of the fluid discharged by the pump. Any suitable pressure indicator 52 may be attached in the discharge line of the pump to indicate the fluid pressure in the system.

Conduits 24 and 26 are connected to their respective coils 20 and 22 by sponge carrying devices generally indicated at 54 and 56 respectively. Reference will be made hereinafter to the details of construction of these devices. For the moment it will suffice to state that these devices, 54 and 56, are both capable of introducing sponges into the circulatory fluid system when the fluid flow is from these devices toward the coils being cleaned and capable of capturing the sponges and retaining the same from further travel when the direction of fluid flow is from the coils to these devices. Thus the cleaning sponges are kept from reaching the apparatus mounted on base 14 and are introduced and removed from the system without interrupting the flow of fluid in either direction therethrough. As will be explained more fully hereinafter, device 54 is particularly adapted to inject sponges into the fluid system at the beginning of the cleaning operation, while device 56 is particularly adapted to extract sponges from the fluid system at the conclusion of the cleaning operation. The devices 54 and 56 may be attached directly to the discharge ends of the beer taps or they may be connected by any other suitable means to the coils 20 and 22.

When in operation, the valve control device 42 is adapted to direct the fluid pressure either in

one direction through the coils 20 and 22 or in the opposite direction. At the same time, however, the valve 42 is adapted to maintain a uni-directional flow through the pump and the tank on the base 14. When the four-way valve 42 is turned in the manner illustrated in Figure 1 the fluid discharged by the pump travels in the direction of the arrows indicated in this figure through the conduit 26, the coil 22, conduit 30; thence through conduit 28, coil 20, conduit 24, and through the four-way valve 42, the conduit 44, and into the detergent tank 12 where it is carried to the inlet 16 of the pump by way of conduits 40 and 38. Upon turning the four-way valve 45 degrees counter clockwise, the discharge of the pump will be through the above named elements of the fluid system in inverse order to that set forth above. However, it will be noted that irrespective of the direction the fluid flow is directed through the coils 20 and 22, the fluid is constantly delivered into the tank 12 in one direction. As the fluid pressure of the pump enters either the sponge-carrying device 54 or 56 it picks up one or more swabbing sponges and carries the same through the system to the other sponge-carrying device. When these sponges reach the latter device they are stopped from further travel in the fluid system so that they do not pass to the four-way valve. The sponges act in the same way if the fluid is passed in the opposite direction through the system. It is therefore seen that by controlling the four-way valve 42 it is possible to cause the sponges to travel back and forth through the system during the cleaning operation. This is an improvement over the method of operation disclosed in my Patent No. 2,015,567, wherein sponges can only be passed in one direction through the coils.

In Figures 2 and 3 I have shown an apparatus embodying the features of this invention which is particularly adapted for portability and as a result thereof can be carried about and attached to coil systems in different localities for cleaning purposes. The various elements of this apparatus include a pump, a detergent mixing tank and a four-way valve all associated together in the manner described in Figure 1. The pump element in the modified structure in Figures 2 and 3 is indicated at 60, the detergent mixing tank at 62, and the four-way valve at 64. A base 66 supports these elements and carries a motor 60 for operating the pump and a housing 70 for enclosing a coiled electric cord 72 which has a plug 74 for attachment to any suitable source of electric current. The current supplied by the electric cord 72 is fed to the motor by any suitable electrical conducting element under the top of the base 66. The electric cord housing 70 contains suitable spring means for withdrawing the electric cord 72 there within when the apparatus is not in use. The electric motor is preferably coupled with the pump 60 by means of a resilient connection generally indicated in dotted lines at 76. The handle 78 is connected to the base by way of a shaft 80. This handle facilitates carrying the apparatus about.

The preferred construction of the detergent mixing tank is that shown in the drawings. It comprises a cylindrical glass wall 82 supported at the bottom edge in a recess provided in the base 66. Mounted upon the top of the glass wall 82 is a metal tubular element 84 which forms the neck for the tank. This last element is provided with a flange 86 which overlaps the glass wall 82 of the tank and from which reinforcing

rods 88, spaced at intervals around the glass wall 82 extend downwardly to the top of the base 66 where each is secured by any suitable means such as a nut 90. Hinged to the top of the element 84 is a cover or closure member 92. Suitable mechanism is provided for closing the cover 92 in a manner to resist the fluid pressure developed in the system. In the embodiment of the invention disclosed herein this mechanism comprises a handle 94 having arms 95 yoked around the cover 92 and journaled to the element 84 adjacent the top of the glass wall as shown in Figure 4. The cover 92 is provided with a cammed surface 96 upon which the base of the handle 94 is adapted to ride. The handle 94 is removably secured to the yoked arms 95 and within the handle there is provided a threaded member 98 which projects from the base of the handle into contact with the cam surface 96. When wear takes place the threaded member 98 may be adjusted downwardly and bear upon the cam surface with the same degree of pressure as when the device was first made.

The base of the tank 62 is provided with an outlet 100 which communicates with a conduit 102 cast in the case 66. The outlet 100 is preferably formed in the center of the bottom of the tank 62 and the bottom of the tank is downwardly inclined to the outlet as shown in Figure 4. The outlet 100 is also preferably screened by a relatively fine screen mesh 106 and retained therein by any suitable mechanism such as an annular snap spring 108. As previously described the detergent mixing tank is provided with a delivery pipe 110. This pipe is provided with a nozzle 112 secured to the end thereof and adapted to discharge the fluid in the delivery pipe laterally towards the outer edge of the bottom 104 of the detergent tank as shown by the fluid flow lines in Figure 4. Both at the top and the bottom of the glass wall 82 and also around the rim of the element 84 where the cover bears thereon there are provided suitable washers, or gaskets, such as annular rubber elements 114 which seal the detergent tank against the escape of fluid. The provision of these gaskets is important because when the beer coils are first flushed with clear water to remove beer from lines all connections on the tank must be air tight otherwise the suction of the pump will not draw water from the tank.

In the apparatus disclosed in Figures 2 and 3 the handle 116 when swung from its full line position to its dotted line position as shown in Figures 2 and 3 operates the four-way valve 64 and reverses the flow of fluid through the coils to which the apparatus is attached. A fluid inlet to the pump is indicated at 118 and a fluid outlet thereto at 120. The inlet 118 is connected to the detergent tank by way of the pipe line 122 and the conduit 102 in the base 66 of the apparatus. The discharge outlet 120 of the pump communicates with the bottom port of the four-way valve 64. The delivery pipe 110 receives fluid from a pipe 124 which in turn is connected to the top port of the four-way valve 64. The two remaining ports of the four-way valve are adapted to communicate with opposite ends of the coil system in the manner shown in Figure 1.

In Figures 5 to 8 I have shown an improved construction for the sponge carrying devices illustrated generally at 54 and 56 in Figure 1. These devices constitute an improvement over similar devices disclosed in my Patent No.

2,015,567. The devices 54 and 56 herein are both adapted to introduce sponges into the fluid system and to capture the same therefrom without interrupting the flow of fluid through the system. This is not true of the sponge extracting device in my above referred to patent which is capable only of extracting sponges from the fluid line and not of returning the sponges to the line. In order to assist in the cleaning operation, both of the devices 54 and 56 illustrated herein are provided with transparent sections which enable the operator to observe what is taking place in these devices. This is important in view of the fact that when reversals of fluid flow take place in the coil system it is desirable to know whether the sponges have passed completely through the coils and this can only be determined by their arrival into the chambers of the devices 54 and 56.

In Figures 5 and 6 I have shown a sponge injecting device which is similar in operation to that shown in my above referred to patent. It comprises a base element 130 and an open casing 132 which surrounds an annular transparent element 134 which may be composed of glass. The casing is provided with a top element 136 having a tapered opening 138 which is adapted to be coupled to a pipe such as the discharge outlet of a beer tap. The base element is provided with an angular passage 146 to which a flexible conduit leading to the four-way valve may be attached. An internally threaded annular ring 148 is interlocked with the base of the casing 132 and is adapted to be threaded to an outer threaded portion of the base element 130 so as to draw the casing and the base element into close engagement. Along the top and bottom peripheral edges of the glass element 134 are provided annular washers 150 which seal the devices against escape of fluid.

Within the glass element 134 is a rotatable member 152 which is provided with grooves in its outer peripheral surface opening into the inner surface of the glass element 134. These grooves are indicated in Figure 6 as being of different sizes. Grooves 154 are of the size adapted to receive one swabbing sponge. Grooves 156 are of a size to receive two or more swabbing sponges. The first mentioned grooves are partially closed by pins 158 which prevent the sponges received therein from passing into the passage 146. The grooves 156 are provided with apertured plates 160 which also function to retain the sponges therein but allow the fluid to pass therethrough. As in my above referred to patent, the rotatable member 152 is operated by a knurled control knob 162 having a stem which enters through the bottom of the base element 130 for rotating the member 152. When the latter is rotated, the grooves 154 and 156 therein are adapted to appear successively in alignment with the fluid passage formed by the elements 138 and 146. Suitable means, such as a spring pressed detent 164 may be provided for releasably locking the rotatable member in those positions where the grooves align with the passages through which the cleaning fluid is discharged. To load the device shown in Figures 5 and 6 the swabbing sponges are successively introduced through the passage 138 as the member 152 is rotated within the glass element 134.

It should be noted that the glass wall 134 co-operates with the grooves of the rotatable member 152 to form the pockets or chambers into which the cleaning sponges are deposited. At

the same time this enables the operator to observe the operation of this device during the cleaning operation.

In Figures 7 and 8 I have shown the device adapted to both introduce and extract cleaning sponges from the fluid system to which it is attached. This device likewise comprises a base element 170 and an open casing 172 enclosing, as in the previous device, a glass wall 174. These elements are assembled together in exactly the same way as the device described in Figures 5 and 6, that is to say, an internally threaded ring 176 is adapted to bring these elements into close fluid-tight engagement. The case 172 is provided with a top section 178 having an element 180 which is adapted to attach the device to any suitable leadin pipe of the coil to be cleaned. The base element 170 is provided with a passage 182 which is adapted to be connected to the flexible conduit leading to the four-way valve on the apparatus. The base element 170 is also provided with a passage 184 through which sponges may be discharged from the device. This passage is widened at one point and a valve 186 is rotatably mounted therein to either open or close this passage. When the apparatus is in operation the valve 186 is usually closed so that the sponges within the chamber formed by the glass wall 174 cannot escape except by the passage 188 in the connecting element 180. To prevent the escape of the sponge through the passage 182 there is provided a dome-shaped slotted member 190 which opens inwardly into the chamber formed by the glass wall 174. The slots in this member are of sufficient size to permit the passage of cleaning fluid in opposite directions through the device.

During the cleaning operation, the swabbing sponges which are injected into the system by the device shown in Figure 5 are extracted from the fluid system by the device shown in Figure 7. The sponges enter the latter device by way of the passage 188 and by virtue of the transparent wall 174, the operator can tell when this arrival has been effected. When the handle to the four-way valve is thrown to its opposite extreme position, the fluid pressure developed by the pump is sent through the coil system in a direction reverse to that indicated by the arrows in Figure 1 and the sponges contained in the chamber of the device 56 are picked up by this fluid and returned through the coils to the device shown in Fig. 5. To facilitate the removal of the sponges from the device in Figure 7, the dome-shaped element has been slotted in such a way that the fluid flow entering the chamber by way of this element is directed laterally over the base element 170 to insure that the sponges in this chamber are caught up by this fluid and carried back through the coil system. In practice it is found that such a construction was necessary otherwise at certain times the sponges would simply spin around inside the device without following the flow of fluid up through the passage 188.

In Figures 9, 10 and 11 I have shown a four-way valve construction which I have modified for use with the coil cleaning apparatus described heretofore. The valve is particularly adapted for preventing leakage over a long period of use. As is usual in four-way valve structures the valve body 200 is provided with four ports 202 spaced diametrically opposite one another with each opening into a central bore 204. A rotatable tapered valve control member 206 is recessed on

opposite sides thereof to provide passages 208 and 210 between the ports of the valve. A removable cap 212 is threaded to one side of the valve body and a coiled spring 214 yieldingly maintains the tapered surface of the valve body in contact with the wall of the bore 204. The coiled spring 214 is received over a stud 216 which maintains the spring in resilient contact with the end of the valve member.

The opposite end of the valve is constructed in a novel manner to prevent leakage of fluid and to control the extent of movement of the valve operating handle. The valve member 206 has a portion 218 of reduced diameter and a squared valve stem or shank 220 to which a valve operating handle 222 is removably secured. The valve body 200 is provided with a part 224 which encircles the reduced portion 218 and extends partially over the squared valve stem 220 as shown in Figure 9. The outer edge of the part 224 is cut away at 226 for a quarter of its circumference to provide a path of a predetermined length for a pin 228 threaded to the stem 220. The extremities of the cut away part at 226 form stops limiting the extent of movement of pin 228 and as a result limiting the rotatable movement of the valve member 206 to a quarter turn. A handle 230 is removably secured to the end of the valve stem for turning the valve member.

Between the part 224 and the reduced portion 218 of the valve member there are provided packing elements for the purpose of preventing leakage. These elements include a ring member 232 engaging the shoulder on valve member 206 formed by the reduced portion 218, packing material 234 preferably graphite, and a secured ring member 236 threaded to the inner wall of the part 224. As shown the faces of the ring members which engage the graphite packing are tapered inwardly so as to direct the graphite upon the reduced portion 218 of the rotatable valve member. Threaded adjustment of the ring member 236 will vary the compression upon the packing material 234 and diametrically opposite grooves 238 are formed in the outer face of this ring member enabling a spanner wrench to engage the same for adjustment. As the valve wears and leakage occurs, threaded adjustment of the ring member 238 toward the other ring member will increase the pressure of the packing and stop further leakage.

The procedure for cleaning pipe systems, particularly beer coils, is similar to that described in my patents referred to hereinabove. The coils are first flushed with clear water to remove any beer remaining in the coils. This may be done by connecting the intake of the detergent mixing tank to some source of water such as a water tap and operating the pump to force the water through the coil system. The flush water passed through the coils in this manner is not returned to the tank but simply discharged where it can be seen. When clear water appears in the discharge from the coil system the system has been cleaned of any beer and is now ready for the detergent cleaning solution. During the initial flushing operation, the detergent tank should be sealed otherwise the pump will not function properly.

After the flushing operation, the apparatus is connected up as shown in Figure 1. Detergent material is poured into the mixing tank 12 and cleaning sponges are loaded into the device 54. The pump is started and the fluid flows through

the system in the direction indicated in Figure 1. One or more cleaning sponges can be fed into the system by rotating the control knob provided on device 54. Turning the four-way valve 42 will reverse the flow of the cleaning fluid and cause the sponges to travel back and forth in the coil system. At the conclusion of the cleaning, the sponges may be all collected in the enlarged chamber of device 56 and emptied therefrom by cutting off the return of the fluid to the four-way valve and causing it to pass out the sponge outlet 184. The fluid may be cut off from return to the four-way valve by kinking the flexible conduit 24.

In Figure 1 the apparatus is shown connected to two beer coils for cleaning both together. It is obvious that suitable connections can be provided for connecting the apparatus to one coil or to three or more coils if desired.

Throughout the specification and claims, the word "sponges" is intended to broadly designate any type of pellet or swab which is capable of assisting in the cleaning of pipe systems such as beer coils. Likewise the word "coil" is intended to refer broadly to any type of pipe system.

25 What I claim:

1. A sponge carrying and feeding device for cleaning pipe lines comprising, in combination, a fluid line, a rotatable element having a plurality of grooves in the face thereof and adapted to be brought successively into registration with said line, means for releasable locking said element in its rotatable movement as each groove thereof registers with said line, and a stationary transparent sleeve-like member encircling said element and forming in conjunction with the peripheral grooves thereof a series of compartments into which sponges may be loaded.

2. A sponge carrying and feeding device for pipe cleaning apparatus having top, bottom and side wall elements forming a chamber in which a plurality of cleaning sponges may be collected, said top and bottom elements each having a port opening into said chamber through which fluid may be admitted or discharged, said bottom element also having a sponge discharge outlet for emptying the chamber of the sponges contained therein, a valve for controlling said sponge discharge outlet, and a member in said chamber obstructing the port in the bottom element so that the sponges in said chamber cannot escape by way of this port, said obstructing member arranged to deflect the flow of fluid laterally so as to cause the fluid entering by way of this port to pick up and carry any sponges in the chamber out through the port in said top element.

3. Apparatus for cleaning a fluid pipe line comprising, a liquid pressure pump, conduit means for coupling the pump to the opposite ends of a pipe to cause the flow of liquid under pressure therethrough, a detergent tank for containing chemical cleaning material, means for connecting said tank in said conduit means so that the liquid caused to flow through said conduit means also flows through said tank, means for introducing cleaning sponges into the flow of liquid through said conduit means to the pipe to be cleaned and to retrieve such sponges from the flow of liquid in the conduit means leaving the pipe to be cleaned without interrupting the flow of liquid through the system and without opening the system to atmosphere, said tank being fluid tight when closed so that the entire system including the pump, conduit means, sponge introducing and retrieving means and the pipe to which the apparatus is connected is capable of forming a closed

circulatory fluid tight system thereby enabling the pump to develop considerable pressure and to prime liquid through the tank.

4. A detergent tank for pipe cleaning apparatus comprising, in combination, a bottom, side walls and a top assembled together in fluid tight relationship, a movable closure member in the top of the tank through which detergent material may be introduced, means for sealing the closure member to the top of the tank in a fluid tight manner, means for adjusting the action of said sealing means to compensate for wear, the bottom of said tank provided with a discharge outlet, an intake pipe extending downwardly from the top of the tank and having its discharge end terminating slightly above the discharge outlet in the bottom of the tank, and means in the discharge end of said intake pipe for directing the fluid discharged thereby laterally toward opposite sides of the discharge outlet in the bottom of the tank to create a turbulent circulatory action of the fluid in the tank and thereby keep the detergent used in a thoroughly mixed state.

5. Apparatus for cleaning a fluid pipe line comprising, in combination, a liquid pressure pump, a detergent tank for containing chemical cleaning material, said tank having a fluid delivery fitting and a fluid discharge fitting, conduit means for connecting one side of the pump to one end of a pipe line, conduit means for connecting one of said fittings on the tank to the other end of the pipe line, conduit means connecting the other side of the pump to the remaining fitting on the tank, means for sealing the connections of said conduit means to said pump, tank and pipe line in a liquid tight manner, a closure member on the tank which, when opened, will allow access to the interior to introduce cleaning material thereinto, means for sealing said closure member to the tank in a liquid tight manner whereby when the conduit means is connected to the opposite ends of a pipe line a closed liquid tight circulatory system including the tank is formed through which a liquid cleaning solution can be forced by the pump under considerable pressure.

6. A detergent tank for pipe cleaning apparatus comprising, in combination, a bottom, a cylindrical side wall, a top member, means securing said parts together in a fluid tight manner, a closure member hinged to said top member through which detergent material may be introduced into the tank outlet, means for drawing off fluid from substantially the center of the bottom of said tank, a pipe for delivering fluid material into the tank extending through the top member from the outside of the tank and having its discharge end closely adjacent to the bottom of the tank, and means in the discharge end of said pipe for directing the fluid laterally toward the portions of the bottom around said outlet means.

7. A detergent tank for pipe cleaning apparatus comprising, in combination, a fluid tight chamber, an outlet opening in the bottom of said chamber, means for screening said outlet opening, a fluid delivery pipe supported in the upper end portion of the chamber and extending downwardly into the chamber, the discharge end of said delivery pipe terminating in slight spaced relationship to the screen outlet opening, and means in the discharge end of the delivery pipe for discharging the fluid delivered thereby laterally to one or more sides of the outlet opening and thus create a turbulent condition in the tank when in use.