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TUBE OR COIL CLEANING APPARATUS

Filed March 7, 1960

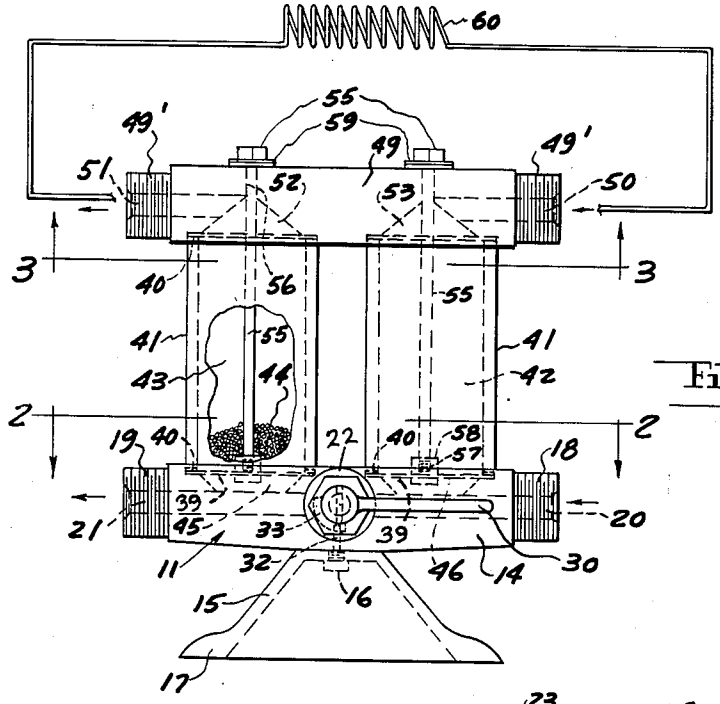


Fig. 1

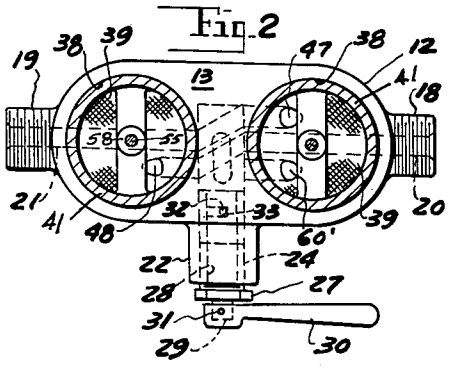


Fig. 2

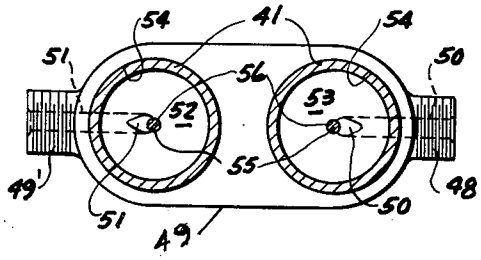


Fig. 3

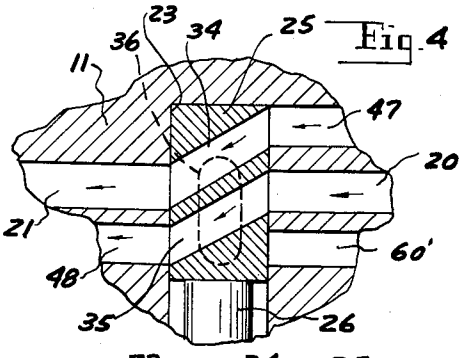


Fig. 4

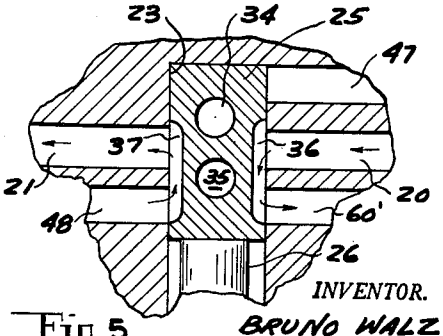


Fig. 5

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TUBE OR COIL CLEANING APPARATUS

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My invention relates to a new and useful improvement in tube cleaning apparatus, and more particularly to a tube cleaning device adapted for the cleaning of beverage coils as are used in dispensing beer, root beer and the like.

The present invention is an improvement and simplification over my prior United States Patent 2,882,539, dated April 21, 1959 relating to a tube cleaning mechanism.

It is the primary object of the present invention to provide a tube cleaning apparatus adapted for connection to a source of water under pressure together with valve means for determining the flow of said fluid and an abrasive cleaning element through the ends of a tube or coil to be cleaned with the return flow back through the mechanism and an outlet to a suitable drain.

It is a further object to provide a movable valve element having two control positions whereby in one control position the pressure fluid and abrasive elements are directed through the tube or coil in one direction, and in another position of adjustment water under pressure and abrasive elements will return through the tube or coil in the opposite direction for removing surface dirt on the interior of the tube and breaking up encrustations or other material collected from the interior surface of the tube to be cleaned.

It is a further object to provide in conjunction with the present apparatus a pair of upright transparent tubes, one of which contains an abrasive tube cleaning element or substance which in one position of the control valve moves with the water under pressure through the tube to be cleaned and collects within the second upright storage tube; and upon reverse of the valve element said pressure is reversed in direction so as to return fluid from the second tube, including the abrasive elements back through the coil to be cleaned in the opposite direction, returning the abrasive elements for storage within the first storage tube.

These and other objects will be seen from the following specification and claims in conjunction with the appended drawing in which:

FIG. 1 is a front elevational view of the present tube cleaning apparatus partially broken away for illustration and schematically indicating a coil to be cleaned with respective ends thereof connected to the said tube cleaning apparatus.

FIG. 2 is a section taken on line 2—2 of FIG. 1.

FIG. 3 is a section taken on line 3—3 of FIG. 1.

FIG. 4 is a fragmentary plan section through a central portion of the base showing the relationship between the fluid inlet and outlet passages, fluid delivery passages and the valve porting, in one control position of said valve.

FIG. 5 is a similar view showing the arrangement of porting and passages with the valve in its second control position.

It will be understood that the above drawing illustrates merely a preferred embodiment of the invention and that other embodiments are contemplated within the scope of the claims hereafter set forth.

Referring to the drawing, the present tube cleaning apparatus includes an elongated base 11 rounded at its opposite ends at 12 having a substantially flat top surface 13 and tapered bottom surfaces 14 centrally mounted upon the pedestal 15, preferably of a hollow construction, suitably secured at 16 to a central bottom portion of said base, said pedestal including an annular enlarged

support member 17, which is flat on its undersurface, as particularly shown in FIG. 1.

Opposite ends of base 11 are exteriorly threaded at 18 and 19 with respect to the longitudinal passage which extends axially through members 18 and 19 and which defines at one end the inlet 20 adapted for connection to a source of fluid under pressure, and defines at its opposite end the outlet 21 adapted for connection with a suitable drain.

Boss 22 projects forwardly from one side of base 11 and has a bore interiorly threaded at 24 in axial communication with the cylindrical bore 23 which extends into base 11 intersecting and communicating with the base passage 20—21.

Manually rotatable valve 25 of cylindrical shape is nested within bore 23, and includes a shank 26 of reduced diameter which projects outwardly through boss 22 and has secured at its outer end as by the pin 31 the control handle 30.

The sealing gland 27 constructed of brass or equivalent material sealingly receives the valve shank 26 and is operatively threaded into the boss 22 for sealing the valve 25 within the base 11. The gland 27 cooperatively engages stem 26, as indicated at 28 in FIG. 2, the outer end of said shank being shown at 29.

An upright interiorly threaded bore extending from the bottom of base 11 receives the set screw 32 whose inner end operatively and retainingly extends into the arcuate groove 33 formed in the valve stem 26. This groove has an arcuate length which limits the rotary movement of the valve 25 between its two control positions through an arc of substantially 90 degrees.

As shown in FIGS. 4 and 5 the valve 25 has a pair of inclined passages 34—35 extending therethrough which assume the control position of FIG. 4. The valve also includes a pair of oppositely arranged surface grooves 36—37 which as shown in FIG. 5 correspond to the second control position of the valve.

A pair of circular recesses 38 are formed in spaced relation down into the top surface 13 of the base 11 upon which are nested and supported the circular disc-like screens 39. A suitable annular sealing gasket 40 is positioned within the respective recesses 38 and a pair of upright transparent tubes 41 are mounted upon the said base with the lower ends enclosed by said base within the recesses 38 and in sealing engagement with the respective gaskets 40. The upright sleeves 41 respectively define the chambers 42—43 within one of which, for illustration, there is stored a quantity of abrasive tube cleaning elements 44, such as small spheres of glass or plastic or other abrasive material of a diameter in excess of the meshing of the screens 39 by which the said abrasive material is retained within a particular chamber 42—43.

Portions of the base 11 are cutaway or chambered as at 45—46 respectively directly below the corresponding screens 39. A pair of delivery passages 48 and 47 are formed within the base 11 with their respective upper ends in communication with the respective chambers 45—46 and with their inner ends respectively communicating with the bore 23 receiving the valve 25. A head 49 of aluminum or other metal is substantially of the same shape as the base 11 and has a substantially flattened undersurface corresponding to the top surface 13 of the base 11. Head 49 is spaced above base 11 and is secured thereto, being mounted on and suitably recessed at 54 so as to receive and sealing-enclose the upper ends of sleeves 41, there being suitable annular gaskets 40 interposed between the upper ends of these sleeves 41 and the corresponding recesses formed in the undersurface of the head 49 corresponding to recesses 38 in FIG. 2.

A pair of conduits are formed independently within

the head 49 with their inner ends respectively communicating with the upper ends of the sleeves 41 through the corresponding chambers 52 and 53 shown in FIG. 1. The outer ends of the conduits define outlet 51 and the inlet 50 adapted for connection to the respective opposite ends of the coil 60 diagrammatically shown which is to be cleaned by the present apparatus. The head 49 at its opposite ends is formed with a pair of cylindrical bosses which are exteriorly threaded at 49' to provide the proper fitting for securing the respective ends of the tube or coil 60 during the cleaning operation.

The head 49 is fixedly secured with respect to base 11 by the spaced upright bolts 55 which extend through washers 59, openings 56 in head 49 and are threaded as at 57 down into the boss 58 arranged centrally within each of upright transparent sleeves 41, completing the assembly shown in FIG. 1.

Referring to FIGS. 2, 4 and 5 there is shown formed within the base 11 an additional delivery passage 60' whose inner end communicates with the valve bore 23 and other end communicates with chamber 46 at the lower end of the corresponding sleeve 41.

Operation

The rotary valve 25 has two positions of use. The first position of control is shown in FIGS. 1, 2 and 4 wherein pressure fluid from the inlet passage 20 passes through the opening 35 in the valve into the delivery passage 48 through chamber 45 and up into the lower end of the left hand transparent sleeve 41. Chamber 43 fills with fluid and the flow of the fluid is through and out the upper end of chamber 43 into chamber 52 and the outlet 51 through the coil 60 returning to the inlet 50 in the head 49 through chamber 53 to the interior chamber 42 of the second upright transparent sleeve 41.

The flow of pressure fluid through the coil 60 carries therewith the small abrasive elements 44 which collect within the second sleeve 41 at its lower end, being retained therein by the corresponding screen 39. The return fluid passes through chamber 46 through the delivery passage 47, the second opening 34 in the valve and into the drain passage or outlet 21 for exhausting. All that is necessary to reverse the operation is to rotate the handle 90 degrees in a clockwise direction from the position shown in FIG. 1 at which time the relative positioning of the valve openings and ports with respect to the base passages is shown in FIG. 5.

In this position of the valve pressure fluid through the inlet passage 20 passes into the valve groove 36 and into the delivery passage 60', chamber 46 and up into the lower end of the right hand transparent sleeve 41 which contains the abrasive cleaning elements 44, as above described. The fluid fills chamber 42 and moves outwardly through chamber 53 and inlet 50 through the coil 60 in the opposite direction from that above described and enters the head 49 at its opposite end through the outlet 51 and chamber 52 into the chamber 43 of the left hand sleeve 41. The fluid carries therewith the plurality of finely divided abrasive elements 44 which are again collected within chamber 43, being retained therein by the screen 39 whose mesh is smaller than the dimension of the particular cleaning elements 44 employed.

The fluid escapes from chamber 43 into the communicating chamber 45 through delivery passage 48, as shown in FIG. 5, valve groove 37 and the outlet 21 for exhausting.

To again reverse the procedure, the handle 30 is rotated 90 degrees in a counterclockwise direction to the original position shown in FIG. 1. This provides a very effective means for cleaning out the tube or coil 60 whose respective opposite ends are connected during the cleaning operation with the respective inlet and outlet 51—50.

Referring to FIG. 5, the additional passage 60' has been shown in the preferred embodiment of the invention. It is contemplated, however, that this passage 60' could be eliminated if the right hand groove 36 had been moved upwardly with respect to FIG. 5 so as to establish communication between passage 20 and passage 47. The operation would be exactly the same because in the control position shown in FIG. 5 the delivery of fluid into passage 20 would pass through the groove 36 in the valve to the delivery passage 47 and up into the bottom end of the chamber 42 of the right hand sleeve 41. This is merely a simplification without departing from the present invention.

Having described my invention, reference should now be had to the following claim:

I claim:

A tube cleaning apparatus comprising a base having a longitudinal passage therethrough defining an inlet adapted for connection to a source of fluid under pressure and an outlet adapted for connection to a drain, there being a transverse bore in said base communicating with said passage intermediate its ends, a rotatable valve sealed within said bore having a pair of passages extending therethrough and a pair of grooves at right angels thereto adapted for selective alternate connection with said inlet and outlet, a pair of upright transparent sleeves with their lower ends mounted on and enclosed by said base, screens respectively closing the lower ends of said sleeves, there being a first delivery passage in said base at one end communicating with said first sleeve, second and third delivery passages in said base at their one ends communicating with said second sleeve, said three passages at their other ends communicating with said valve bore, a head spaced above said base and secured thereto mounted on and enclosing the upper ends of said sleeves, there being a pair of conduits in said head with their inner ends respectively communicating with the upper ends of said sleeves and with their other ends defining an outlet and inlet adapted for connection to opposite ends of a coil to be cleaned, a plurality of abrasive cleaning elements loosely stored within one of said sleeves, said valve being movable to a first control position so that fluid under pressure flows through one valve passage and the first delivery passage into a corresponding sleeve and out a corresponding conduit in said head carrying said abrasive elements through said coil and back through the other conduit to the second sleeve for collection therein, the fluid escaping said second sleeve through a corresponding second delivery passage connected by the second valve passage to said drain outlet, said valve being rotatable to a second control position reversing the flow of pressure fluid through one valve groove and the third delivery passage to said second sleeve and out the corresponding conduit in said head carrying said abrasive elements through said coil in the reverse direction returning via the corresponding conduit to said first sleeve for collection therein, the fluid escaping through the first delivery passage and through the other valve groove to said drain outlet the securing of said head to the base including a pair of parallel spaced elongated bolts extending normally through said head and axially through said sleeves respectively and threadedly engaging said base.

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