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3,132,656

CONDUIT CLEANING SYSTEM

Filed Jan. 31, 1963

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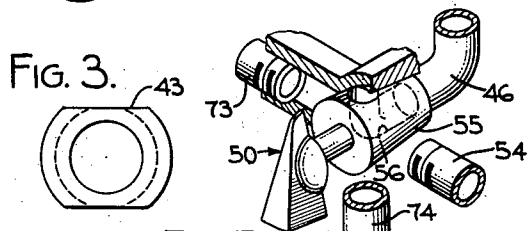
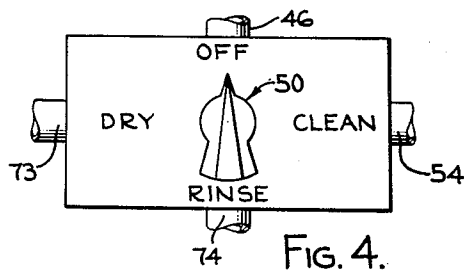
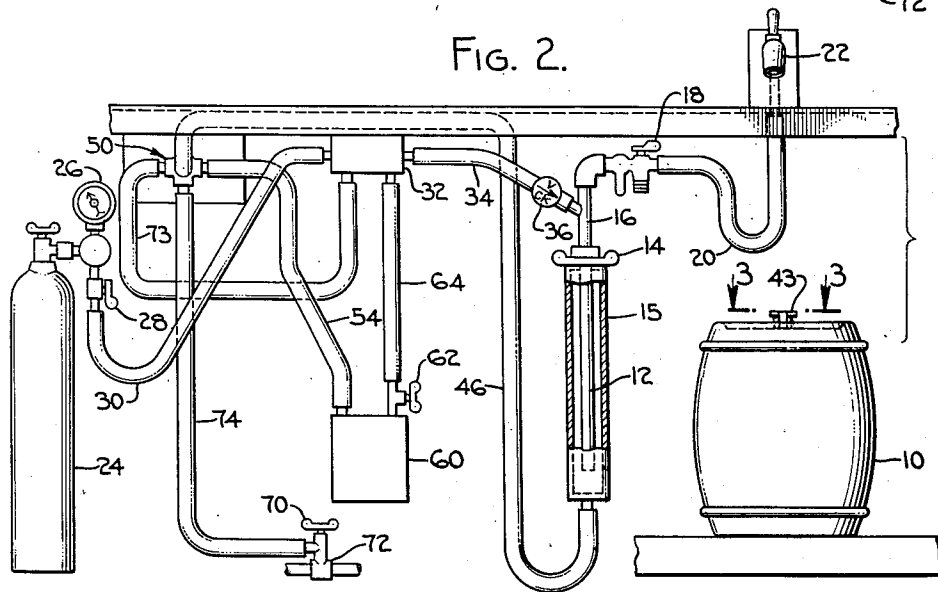
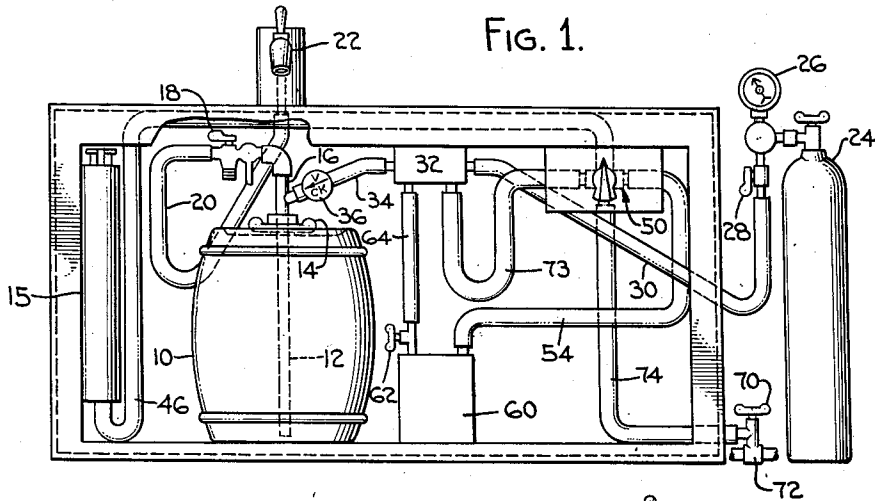


FIG. 5.  
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2 Sheets-Sheet 2

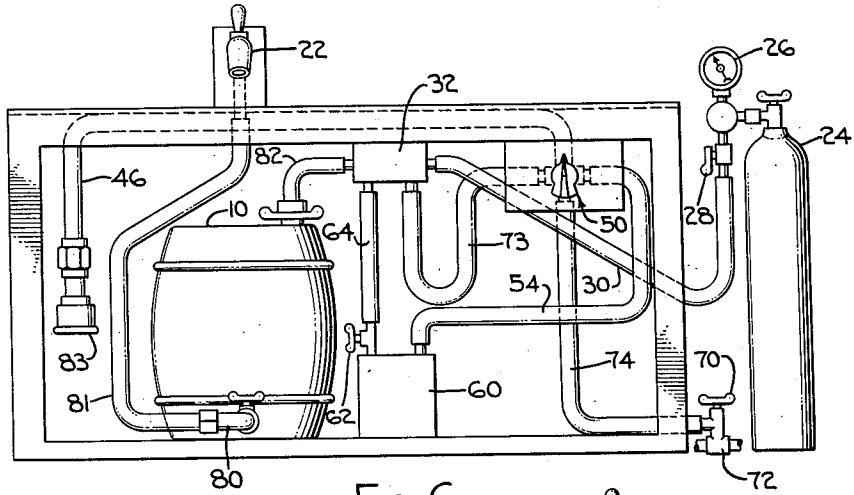


FIG. 6.

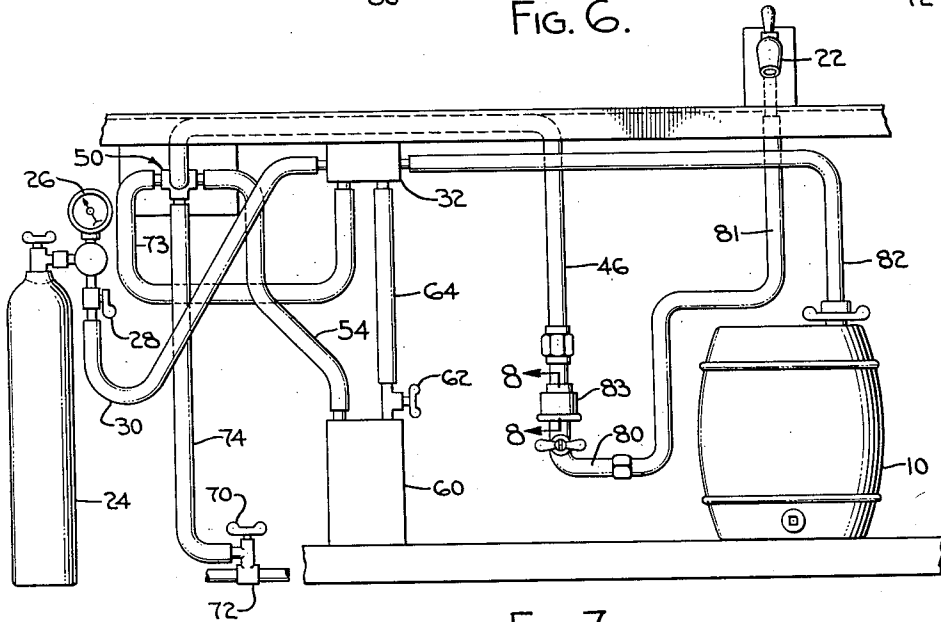


FIG. 7.

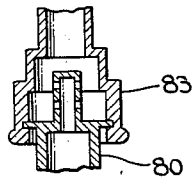


FIG. 8.

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3,132,656  
**CONDUIT CLEANING SYSTEM**  
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 Filed Jan. 31, 1963, Ser. No. 255,241  
 9 Claims. (Cl. 134-98)

The present invention relates to a cleaning system and process. More particularly, the present invention relates to a cleaning system and process which is suitable for cleaning conduits and the like, e.g., beverage dispensing systems.

It has long been known that it is necessary to periodically clean conduits through which liquids which have a tendency to form deposits flow. Such cleaning is especially important for those conduits through which edible materials flow, for reasons of health, taste, etc. Such cleaning is of particular significance in draught beer dispensing systems. As is well known to those skilled in the art, the taste characteristics of beer are strongly influenced by the materials which are deposited in containers and conduits which comprise beer dispensing systems. Furthermore, there can, of course, be no question that it is of great importance that beer have the proper taste, both for economic and gastronomic reasons. Thus, various methods of cleaning beer dispensing systems have been devised by prior art workers. However, all of the prior art methods are subject to certain disadvantages.

Perhaps the most important disadvantage of most prior art methods is that these methods fail to completely clean the entire system. Usually, the tap rod which is inserted into the keg is not cleaned. Thus, an accumulation of impurities in the tap rod usually occurs which accumulation results in contamination of the beer and sourness of taste. In addition, all known prior art methods are extremely slow and thus require that the dispensing system be taken out of operation for a prolonged period time during cleaning. This is obviously undesirable.

The present invention obviates the difficulties which attach to the prior art methods. The present invention provides a cleaning system and process which is capable of rapid operation with a minimum of effort on the part of the operator. Furthermore, the present invention permits cleaning of the entire dispensing system. Surprisingly, the apparatus of the present invention is relatively uncomplicated in structure and extremely easy to operate.

Thus, one of the principal objects of the present invention is to provide a novel and improved cleaning system and process.

Another object of the present invention is to provide a cleaning system and process for beverage dispensing systems.

A further object of the present invention is to provide a cleaning system and process which permits rapid operation and which permits easy attachment and detachment of the cleaning system.

Still another object of the present invention is to provide a cleaning system and process which permits cleaning of an entire beverage dispensing system.

Another object of the present invention is the provision of a cleaning system which is attachable to the conventional connecting elements of conventional beverage dispensing systems.

A still further object of the present invention is to

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provide a cleaning system and process which permits cleaning by a process comprising the steps of flushing with cleansing fluid, flushing with water and pressurization.

5 Another object of the present invention is to provide a cleaning system and process for the rapid cleansing of draught beer dispensing systems.

Other objects and advantages of the present invention, it is believed, will be apparent from the following detailed description of specific embodiments thereof when read in connection with the drawings.

Referring now to the drawings,

10 FIGURE 1 illustrates a preferred embodiment of the present invention attached in non-cleaning position to a conventional top draw beer dispensing system.

FIGURE 2 illustrates the system of FIGURE 1 attached in cleaning position.

FIGURE 3 is a plan view taken on line 3-3 of FIGURE 2.

FIGURE 4 is a front view of the control means which forms a part of the apparatus of the present invention.

FIGURE 5 is an exploded view in partial section of the control valve which may be used in the apparatus of the present invention.

25 FIGURE 6 is a side view of the cleaning system of the present invention attached in non-cleaning position to a bottom draw beer dispensing system.

FIGURE 7 illustrates a beer dispensing system of FIGURE 6 attached in cleaning position.

30 FIGURE 8 is a sectional view taken on line 8-8 of FIGURE 7.

Briefly, the present invention comprises a cleaning system in which some of the significant elements are a control means, which may be a four-way valve, a pressure source, and a source of cleaning fluid. The pressure source and the source of cleaning fluid are connected to the control means by suitable conduits, as is a source of flushing liquid, e.g., water. The control means functions to selectively connect the source of cleaning fluid, the flushing liquid source and the pressure source with a conduit leading to the conduit which is to be cleaned. In a preferred embodiment, the conduit connecting the control means and the conduit to be cleaned is provided with a receptacle means which is adapted for easy attachment to the conduit to be cleaned. In most preferred embodiments of the present invention, the cleaning system may be provided with a four-way pressure distributor and a conduit connecting this distributor to the conduit to be cleaned. Suitable valves may also be provided in one or more of these conduits as may be found desirable.

The cleaning process of the present invention may be performed simply by operating the control means so as to selectively connect the conduit to be cleaned with cleaning fluid, flushing liquid and pressure.

55 Referring now to the drawings, FIGURE 1 illustrates an embodiment of the present invention in which the cleaning system is attached in non-cleaning position. In this position, the apparatus illustrated in FIGURE 1 may be operated as a conventional beer dispensing system. Illustrated in this figure are keg 10, tap rod 12 which is secured to keg 10 in a conventional manner by bayonet grip 14, and vertical conduit 16 which is connected through valve 18 to conduit 20 and spigot 22. Conduit 20 may be cooled by any suitable means,

not shown. A suitable pressure source such as carbon dioxide tank 24 with appropriate gauge 26 and valve 28 is connected by conduit 30 to a four-way distributor 32. Conduit 34 connects distributor 32 with conduit 16. A conventional bladder valve or other suitable check valve 36 is positioned in conduit 34. As illustrated in this figure, the dispensing system operates in the conventional manner such that beer from keg 10 will flow from spigot 22 into a suitable container when spigot 22 is opened.

The cleaning system of the present invention attached in cleaning position is illustrated in FIGURE 2. As shown in this figure, tap rod 12 is attached to receptacle means 15 by bayonet lock 14. Receptacle means 15 is somewhat larger than tap rod 12 both in diameter and length. Receptacle 15 is connected through conduit 46 to control means 50. Control means 50 is preferably a four-way valve such as that illustrated in FIGURE 5. Control means 50 is also connected to conduits 54, 73 and 74. Conduit 54 is also connected to a suitable container 60 which is adapted to contain cleaning fluid under pressure. Container 60 is connected to distributor 32 by conduit 64 which is provided with valve 62.

Control means 50 is connected to water tap 72 which is provided with valve 70. Valve 70 is preferably a conventional saddle valve.

FIGURE 3 illustrates a top view of flanged member 43 of keg 10 which engages bayonet lock 14.

FIGURE 4 is a pictorial view of control means 50 and the elements associated therewith. These elements are conduits 46, 54, 73 and 74 and plate 53 which indicates the various positions of control means 50.

FIGURE 5 illustrates control means 50 in some detail. As here illustrated, control means 50 comprises a rotatable plug 55 having a bore 56 therein. Bore 56 has an angular configuration, one portion of which is axial with rotatable plug 55, and the other portion of which is perpendicular to the axis of plug 55. The axial portion of bore 56 communicates with conduit 46 while the perpendicular portion of bore 56 may be brought into contact with conduits 54, 73 and 74 by rotation of plug 55. In the closed or "off" position, the perpendicular portion of bore 56 is not in communication with any of these conduits and thus effectively closes conduit 46. This is the position illustrated in FIGURE 5.

To operate the cleaning system of the present invention, tap rod 12 is positioned in receptacle 15 and securely attached thereto by bayonet lock 14. Control means 50 should, of course, be in the closed position when this attachment is made. In normal operation, valves 28, 62 and 70 are open at all times and only control means 50 is used to open and close the system. The principal function of valves 28, 62 and 70 is to provide means for closing portions of the system for the purpose of replacing the elements to which they are connected, i.e., cleaning fluid container 60, pressure source 24 and liquid source 72. Preferably, valve 70 is conventional saddle valve which functions to decrease the pressure in line 74.

Container 60 is, of course, provided with sufficient cleaning material before the system is put into operation. In order to accomplish the actual cleaning, control means 50 is actuated to connect conduits 46 and 54. When this is done, the pressure from pressure source 24 passes through conduit 30, distributor 32, conduit 64 and into container 60. This pressure thus forces the cleaning fluid from container 60, through conduit 54, control means 50, conduit 46 and into receptacle 15. The cleaning fluid thus is forced to cover the outside of tap rod 12 as well as being forced through the interior of tap rod 12. The cleaning fluid passes through conduits 16 and 20 and through spigot 22 which is held in the open position to permit continuous cleaning for as long as it is desired. The bladder valve 36 in conduit 34 automatically closes to prevent entry of cleaning fluid into conduit 34.

When the cleaning fluid has satisfactorily removed foreign matter from the dispensing system, control means

50 is actuated to the rinse position whereby conduits 74 and 46 are connected. Suitable flushing liquid, e.g., tap water, then passes through conduits 74 and 46 into receptacle 15 and then through the dispensing system in the same manner as the cleaning fluid. The flushing operation is continued long enough to thoroughly remove the cleaning solution from the dispensing system. Control means 50 is then turned to the dry position whereby conduits 72 and 46 are connected. In this position, the pressure source 24 functions to force excess water out of conduit 46 and the dispensing system. This operation may be continued long enough to thoroughly dry conduit 46 and the dispensing system, but this is not necessary for the great majority of cleaning operations and ordinarily is not done.

When the excess water has been removed from the system, control means 50 is actuated to the closed position and the tap rod 12 is removed from the receptacle 15 and replaced in keg 10. Pressure source 24 may then be used to pressurize keg 10 in the usual manner.

It will immediately be appreciated by those skilled in the art that the cleaning operation just described is extremely rapid and easy to operate. The time required to clean an ordinary beer dispensing system is on the order of a few minutes, usually less than five minutes. This is in marked contrast with the length of time required for the operation of conventional cleaning systems which usually require thirty minutes or more and are obviously extremely tedious. Furthermore, the apparatus and process of the present invention require the manipulation of only a single control means whereas conventional cleaning systems require the manipulation of a large number of valves and similar control means.

Another important advantage of the present invention is that it permits cleaning of the entire dispensing system, including the outside of tap rod 12. Ordinary cleaning systems permit cleaning of only a portion of the dispensing system, usually excluding most or all of the tap rod. Thus, it is usually necessary to either run the risk that the accumulations in the tap rod will contaminate the beverage or to manually scrub the tap rod.

The system illustrated in FIGURES 6-8 is substantially similar to that illustrated in FIGURES 1 and 2. However, the system illustrated in FIGURES 6-8 is adapted to be used with a bottom draw dispensing system.

The bottom draw dispensing system in normal operation is illustrated in FIGURE 6. As shown in this figure, keg 10 is provided with tap rod 80 which is connected to conduit 81. Conduit 81 is in turn connected to spigot 22. Keg 10 is connected to pressure source 24 by conduit 82, distributor 32 and conduit 30. Conduit 46 is provided with receptacle means 83 which is adapted to securely engage tap rod 80. The remaining elements are substantially the same as those illustrated in FIGURES 1-5 and are designated by the same numerals.

The cleaning system is illustrated in cleaning position in FIGURE 7. As shown in this figure, receptacle means 83 is connected to tap rod 80. This connection is illustrated in greater detail in FIGURE 8. This connection is made while control means 50 is in the closed position. Then, in the same manner as that described with respect to FIGURES 1-5, control means 50 is actuated to successively clean, flush, and remove excess flushing liquid. Receptacle means 83 is then detached from tap rod 80 and tap rod 80 is attached to keg 10. The keg is then pressurized through conduit 82 in the usual manner and put back into operation.

It will be readily apparent to those skilled in the art that the present invention may be modified in a variety of ways without departing from the scope thereof. For example, any suitable pressure source, cleaning material and flushing liquid may be used. Furthermore, although the present invention has been described with respect to a beer dispensing system, it is clearly adapted to be used with beverage dispensing systems, fluid transmission systems and the like. The conduits of the apparatus of the

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present invention may be fabricated from any suitable material. However, it is preferred that these conduits be flexible. Therefore, materials such as plastics and copper tubing are preferred. Control means 50 may likewise be any suitable four-way valve or equivalent means. The valve 36 in conduit 34 has been described as a bladder valve, but it should be understood that any suitable check valve may be used.

This application is a continuation-in-part of now abandoned application Serial No. 184,637, filed March 27, 1962.

Having fully described my invention, it is to be understood that it is not to be limited by the specific details set forth, but is of the full scope of the appended claims.

I claim:

1. A liquid dispensing system cleaning system comprising a first conduit connected to a control means, said first conduit comprising means for engaging a liquid dispensing system to be cleaned in pressurizing relation therewith; a second conduit; a third conduit; a fourth conduit; said second, third, and fourth conduits being connected to said control means; a pressure source; a container; said second conduit being connected to said container; said third conduit being adapted to be connected to a flushing liquid source; a fluid distribution means; said fourth conduit being connected to said distribution means; a fifth conduit connecting said pressure source and said distribution means; and a sixth conduit connecting said distribution means and said container.

2. A liquid dispensing system cleaning system comprising a first conduit connected to a valve means, said first conduit comprising means for engaging a liquid dispensing system to be cleaned in pressurizing relation therewith; a second conduit; a third conduit; a fourth conduit; said second, third, and fourth conduits being connected to said valve means; a fluid distribution means; a pressure source; a container; said second conduit being connected to said container; said third conduit being adapted to be connected to a liquid source; said fourth conduit being connected to said distribution means; a fifth conduit connecting said pressure source and said distribution means; and a sixth conduit connecting said distribution means and said container.

3. A liquid dispensing system cleaning system comprising a first conduit connected to a control means, said first conduit comprising means for engaging a liquid dispensing system to be cleaned in pressurizing relation therewith;

a second conduit;

a third conduit;

a fourth conduit;

said second, third and fourth conduits being connected to said control means;

said control means being adapted to selectively connect said first conduit with each of said second, third, and fourth conduits;

a fluid distribution means;

a pressure source;

a container;

said second conduit being connected to said container; said third conduit being adapted to be connected to a liquid source;

said fourth conduit being connected to said distribution means;

a fifth conduit connecting said pressure source and said distribution means;

and a sixth conduit connecting said distribution means and said container.

4. A liquid dispensing system cleaning system comprising a first conduit connected to a control means, said first conduit comprising means for engaging a liquid dispensing system to be cleaned in pressurizing relation therewith; a second conduit; a third conduit; a fourth conduit; said second, third and fourth conduits being con-

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nected to said control means; a fluid distribution means; a pressure source; a container; said second conduit being connected to said container; said third conduit being adapted to be connected to a liquid source; said fourth conduit being connected to said distribution means; said control means being operable to selectively connect said first and second conduits, said first and third conduits, and said first and fourth conduits; a fifth conduit connecting said pressure source and said distribution means; a sixth conduit connecting said distribution means and said container; and a receptacle means connected to said first conduit, said receptacle means being adapted to engage a conduit in sealing relationship therewith.

5. The system of claim 4 wherein said fifth and sixth conduits are provided with valves.

6. A conduit cleaning system comprising a first conduit connected to a control means; a second conduit; a third conduit; a fourth conduit; said second, third, and fourth conduits being connected to said control means; a fluid distribution means; a pressure source; a container; said second conduit being connected to said container; said third conduit being adapted to be connected to a liquid source; said fourth conduit being connected to said distribution means; said control means being adapted to selectively connect said first conduit with each of said second, third and fourth conduits; a fifth conduit connecting said pressure source and said distribution means; a sixth conduit connecting said distribution means and said container; said first conduit being connected to a receptacle means; said receptacle means being adapted to engage a conduit to be cleaned in sealing relationship therewith; and a seventh conduit connected to said distribution means, said seventh conduit being provided with a check valve.

7. A beer dispensing system cleaning system comprising a first conduit connected to a control means; a second conduit; a third conduit; a fourth conduit; said second, third and fourth conduits being connected to said control means; a fluid distribution means; a pressure source; a container; said second conduit being connected to said container; said third conduit being adapted to be connected to a liquid source; said fourth conduit being connected to said distribution means; said control means being adapted to selectively connect said first conduit with each of said second, third and fourth conduits; a fifth conduit connecting said pressure source and said distribution means; a sixth conduit connecting said distribution means and said container; a receptacle means, said receptacle means being adapted to engage the tap rod or a beer dispensing system to be cleaned in such a manner as to surround that portion of the tap rod which is exposed to the interior of a beer keg and in sealing relationship therewith; and a seventh conduit connected to said distribution means, said seventh conduit being provided with a check valve and being adapted to engage a beer dispensing system in pressurizing relationship therewith.

8. A tubular article cleaning system comprising a means for conveying cleaning fluid; a means for conveying flushing liquid; means for conveying pressurizing fluid; a control means, said control means being connected to each of said conveying means; an effluent conveying means connected to said control means; said control means being adapted to selectively connect each of said means for conveying cleaning material, means for conveying flushing liquid and means for conveying pressurizing fluid with said means for conveying effluent; said means for conveying effluent being adapted to be connected to an article to be cleaned.

9. A tubular article cleaning system comprising means for conveying cleaning material; means for conveying flushing liquid; means for conveying pressurizing fluid; control means connected to each of said conveying means; means for conveying effluent connected to said control means; means for containing cleaning material connected to said means for conveying cleaning material; fluid dis-

tributor means connected to said means for conveying pressurizing fluid and to said means for containing cleaning material; said control means being adapted to selectively connect said means for conveying effluent with each of said means for conveying cleaning material, said means 5 for conveying flushing liquid and said means for conveying pressurizing fluid.

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