

Sept. 2, 1969

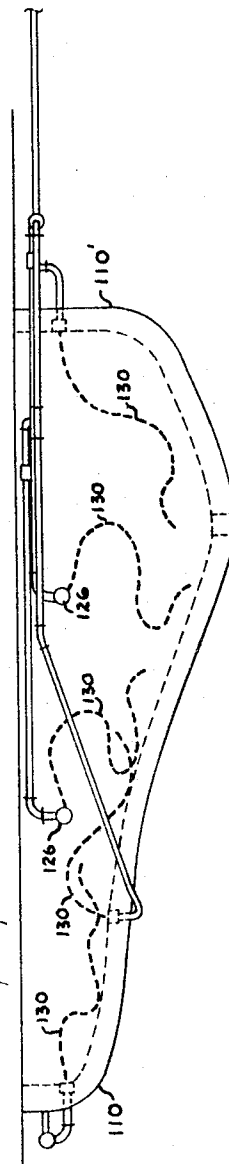
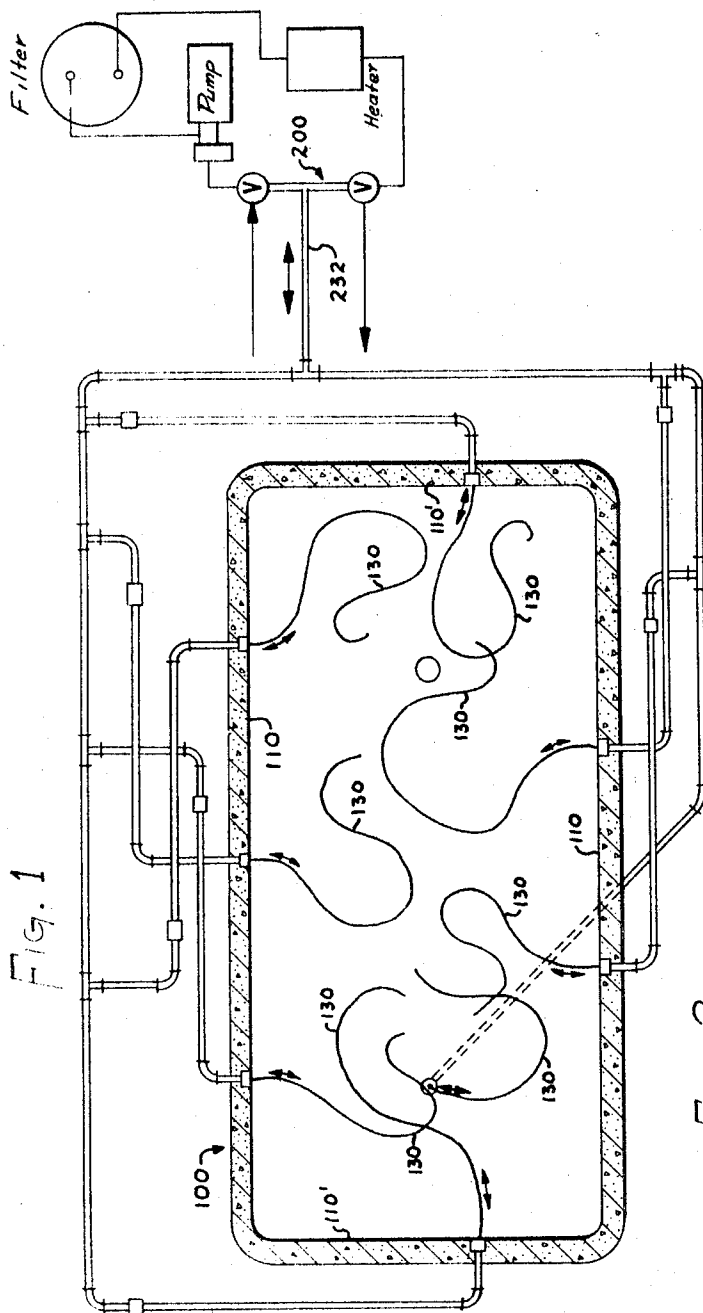
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3,464,068

SWIMMING POOL CLEANING SYSTEM

Filed May 2, 1967

4 Sheets-Sheet 1



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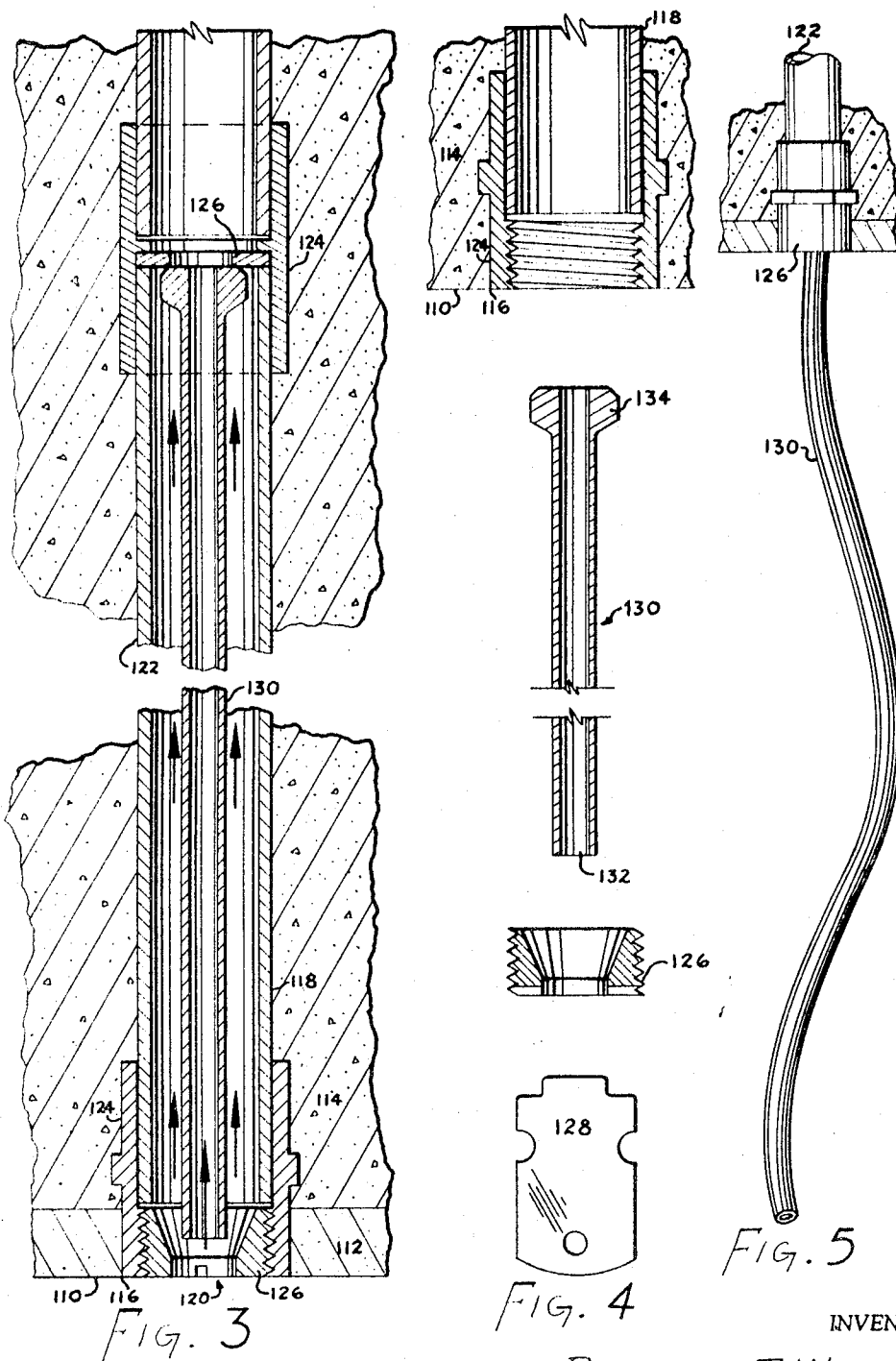


FIG. 4

FIG. 5

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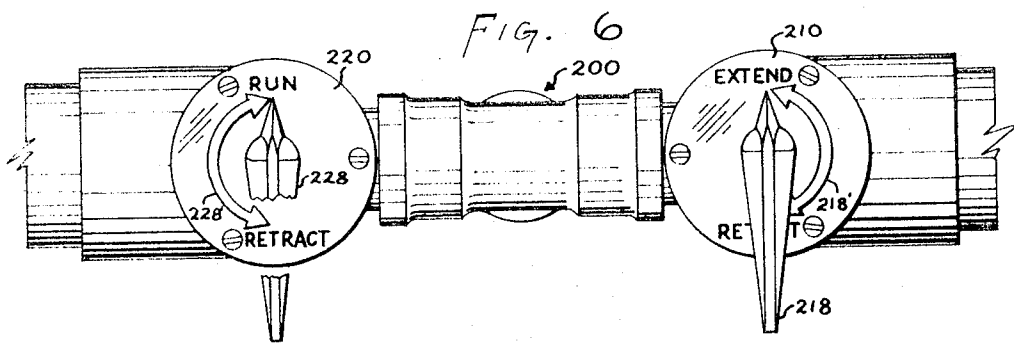
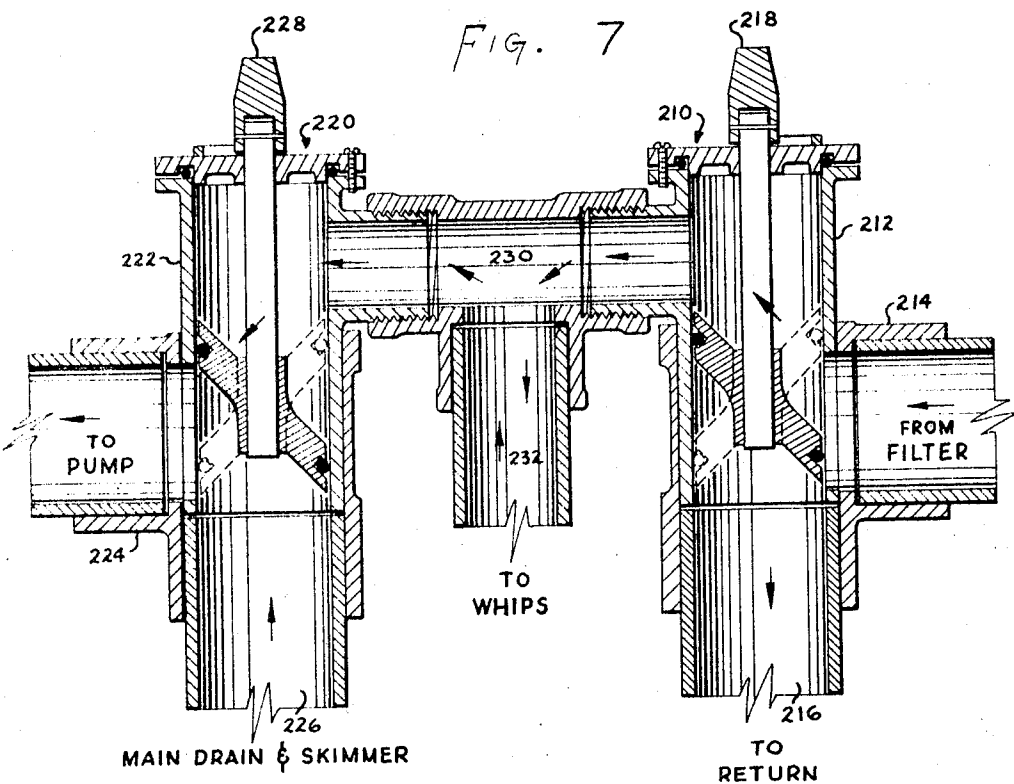
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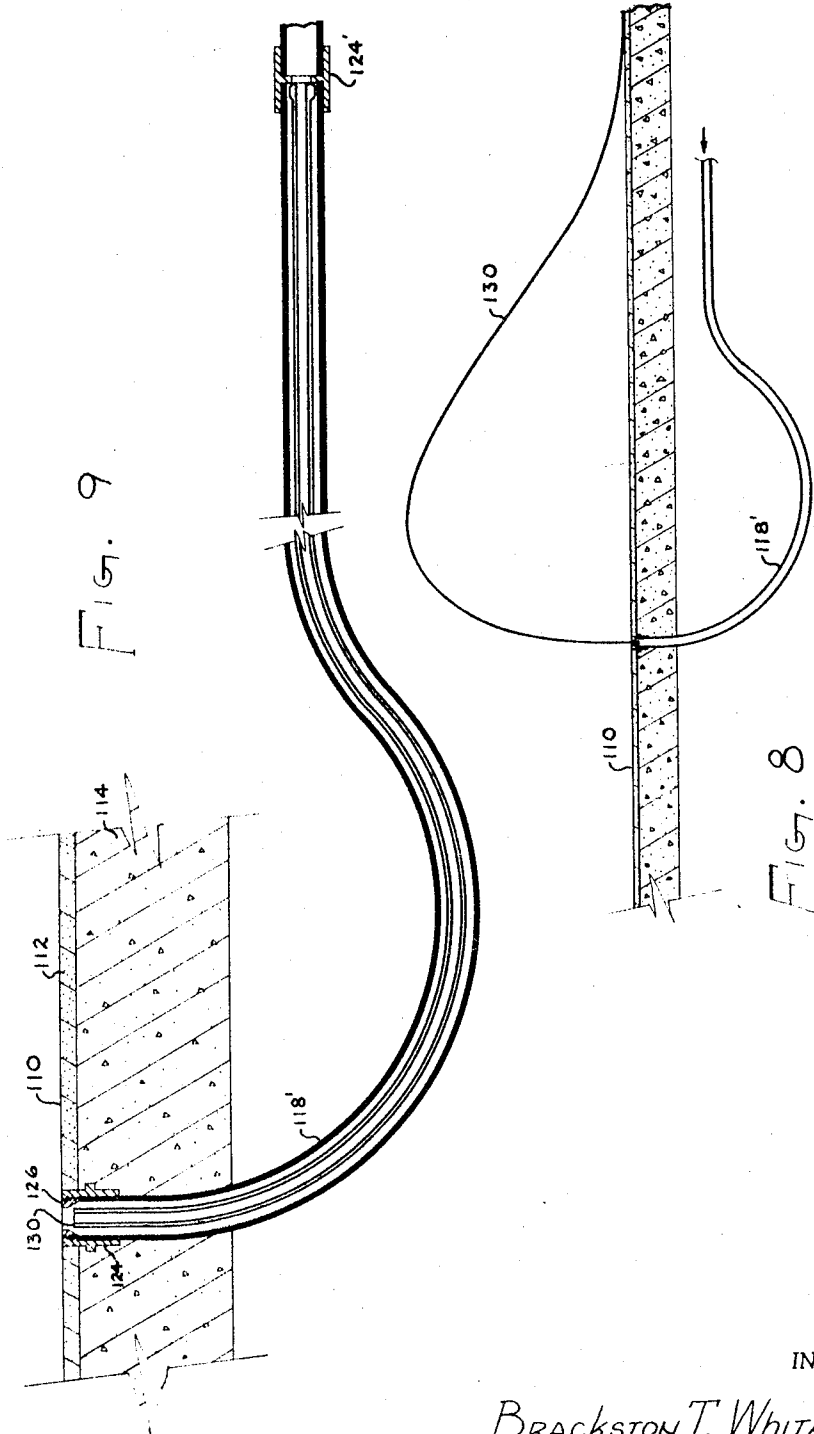
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SWIMMING POOL CLEANING SYSTEM

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U.S. Cl. 4-172

2 Claims

ABSTRACT OF THE DISCLOSURE

An hydraulically operated swimming pool cleaning system, wherein by a flow of water through two actuating valves, plural water exhaust whips may be extended and retracted into the pool closure in a submarine fashion to agitate the water within to perform the cleaning function on the walls and floor of the swimming pool. The system is mounted for facile cleaning replacement and maintenance.

CROSS-REFERENCE TO RELATED APPLICATION

The invention is closely related to my extant Patent 3,278,949, dated Oct. 18, 1966 and entitled Swimming Pool Cleaning Apparatus.

BACKGROUND OF THE INVENTION

FIELD OF THE INVENTION

The invention, while specifically defined in terms of swimming pools, clearly applies to any reservoir closure system containing water or other fluids.

DESCRIPTION OF THE PRIOR ART

Known prior art does not include extensible-retractable means permanently set for installation within the pool as a portion thereof. In this overall system, a unique suction and return valve are included to ensure extension and retraction of unique whips, somewhat along the lines of those shown in my prior Patent 3,278,949, above-mentioned. In this instance, nonetheless, improvements thereover result in an improved overall operating system including mode of installation and control.

SUMMARY OF THE INVENTION

The invention may be said to include a means for installation and control of complemental, extensible-retractable flexible conduits, known as "whips," the relative disposition of which are such as to ensure that the action of one such whip serves to complement the action and counteraction of another, while the respective whips are extended in cleaning position.

Additionally, unique means are provided for maintenance and repair and for the control of the cleaning element during and following operation thereof.

The objectives of invention include means for eliminating the vacuuming of swimming pools and brushing thereof in maintenance cleaning operations. Further, to reduce the amount of sanitizing agent required to maintain the pool and to eliminate calcium buildup on pool finish. These and other objectives such as facile installation, reliance upon a low pressure system, reduction in chemical media used for cleaning; improved circulation of water and chemicals will be apparent from reference to the ensuing description and drawings wherein:

FIGURE 1 is a horizontal section view of pool installation showing the cleaning elements in extended and operative relation;

FIGURE 2 is a vertical sectional view of pool shown in FIGURE 1;

FIGURE 3 is a sectional view of housing and retracted cleaning element, expanded over the one or more clean-

2

ing elements shown in FIGURES 1 and 2 respectively;

FIGURE 4 is an exploded view of the principal elements shown in FIGURE 3 and including means for disassembly thereof;

FIGURE 5 is a view showing the extended position of the cleaning element of FIGURES 1, 2 and 3, the same being amplified over the FIGURES 1 and 2 showings;

FIGURE 6 is a top plan view of valve used in connection with the invention and shown schematically in FIGURE 1;

FIGURE 7 is a vertical sectional view taken along the lines 7-7 of FIGURE 6;

FIGURE 8 is a sectional view of pool bottom indicating the installation of whip housing and showing the whip in extended position.

FIGURE 9 is a sectional view of the elements of FIGURE 8 expanded thereover and showing one "whip" conduit in retracted position.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The broad concept of a vacuum eliminating automatic cleaning system is shown in FIGURE 1. In this showing, the pool 100 comprises side walls 110 and end walls 110' in which are installed plural tubes which are of flexible construction, preferably made of a dial plastic and engineered into the pool's sides automatically to extend out into the pool as shown. Jet streams of filtered water flow from the tubes and as they thus gently whip, dirt and sediment are forced into the pool's main drain, shown as unnumbered in FIGURES 1 and 2, whereupon the dirt and sediment passes to the pool filter. Upon proper operation of the valve 200, the tubes are caused to automatically retract from the pool and disappear out of sight and touch, as will be hereinafter indicated. By the intended extended action of the whips, there is a scouring and polishing, eliminating calcium build-up and algae formations.

With especial reference to FIGURES 2, 3, 4 and 5, the wall 110 is generally provided with a plaster 112 and base concrete liner 114 in which a bore 120 has been formed to accommodate the housing 122, said housing 122 terminating in tubular anchor member 124, said anchor member having threaded portion to accommodate the extended whip seat 126. A corresponding whip conduit retraction seat 126 being held into position by the corresponding coupling or union member 124'. In FIGURE 3, the whip 130 is shown with its intake end seated on the terminal seat 126, the channel of the whip corresponding axially with the slightly enlarged orifice of the seat 126 as shown.

Now, with reference to FIGURE 4, the exhaust seat 126 of the whip housing is removable by key 128, the same being a blank in configuration, adapted to engage corresponding grooves as indicated for de-threaded removal. The key slot is shown to extend transversely across the face of the terminal abutment 126 indicating facile removal of the whip abutment 126 for purposes of cleaning or otherwise exchanging the tubular whip 130.

With especial reference, now, to the valvular means of control, it has been indicated that the system is hydraulically operated by means of a flow of water through two actuating valves, said valves being illustrated in FIGURE 6 and more particularly by detail in FIGURE 7. These valves 210 and 220 respectively include tubular members 212 and 222, each having common hydraulic connection to the conductor 230, said conductor being connected to the whip housings. Additionally, the conductors 212 and 222 respectively have interconnection at 214 to the filter and at 224 to the pump, as shown. At their lower extensions 216 and 226, respectively, the valve systems are

3

connected to the "Return" generally indicated by the lower arrow extending from right to left in FIGURE 1 and the orifice 226 having connection with main drain and skimmer generally indicated schematically in FIGURE 1 by the arrow passing from left to right. See the control flow arrows disposed respectively in the conductors 216 and 226. By way of operation, to retract the tubes 130 into the position shown in FIGURE 3, one simply turns the "Return" control valve 218 to the "Retract" position. That is the position shown in phantom line in FIGURE 7. Simultaneously the suction control valve 220 must be turned to the "Retract" position until the tubes have been completely retracted from the pool into the position shown in FIGURE 3—reference phantom lines shown in FIGURE 7 indicating the "Retract" position of the valve 220. Sequentially and upon retraction of said whips, the suction control valve 228 is rotated to the "Run" or open position, indicated.

To extend the tubes 130, the "Return" control valve 210 is rotated to the "Extend" positions shown in FIGURES 6 and 7 while the suction control valve 220 is in the "Run" position, shown also in FIGURES 6 and 7. By hydraulic ram action on the terminus 134 of the tube 130, the tubes are each fully extended and in practice, with the tubes fully extended, the return valve 210 may be adjusted slightly to get the desired whipping action on the tubes, per se. For example, the more water that is returned through the tubes 130 (the greater the hydraulic pressure), the faster the action of the tubes and the more cleaning and scouring action on the walls of the swimming pool per se. On the other hand, as the water pressure is decreased on the tubes, the slower will be the action of the tubes and the more the cleaning action on the floor and towards the center of the swimming pool. Thus, the action of the tubes may be controlled through the adjustment position on the return control valve 210, which said valve is sensitive in controlling tube action.

With reference now to FIGURES 8 and 9, it will be noted that the housing 110' is of curvilinear configuration from the respective terminal anchors 124 and 124'. This particular installation illustration may be adapted to either sloping or level floor construction and is known as a "through floor whip housing." The illustration is such as to show the necessity for a curvilinear configuration being applied to the whip housing to ensure that the retracted whip of FIGURE 9 may be readily extended without binding to the position shown in FIGURE 8. In practice, the curve applied to the housing for a sixteen foot tubular whip 130 is on a 9" radius from the axis of ejector coupling 126, to the * shown.

With these and the aforementioned installation details in mind, the spirit of the invention is limited by the scope of the claims only.

I claim:

1. In the hydraulic cleaning of fluid reservoirs, said reservoirs having walls, bottom and a fluid circulating system; comprising in sequence a drain line, pump, filter and return line:

4

- (A) plural extensible and retractible flexible conduit means removably housed in the walls of the reservoir;
 - (B) each said conduit means having a pressure responsive head fixed to one end thereof responsive to the flow of fluid through said conduit means, to extend and retract said conduit means into and out of the fluid reservoir, depending upon the direction of fluid flow through said conduit means, and, being disposed for submersible fluid ejecting, interruption contact with the other, whereby substantially all walls of said reservoir may be scoured and the fluid content thereof agitated;
 - (C) each conduit means being secured in housing, the outer end of each housing defining a seat for restrictive extension of the conduit means, the inner end of each housing defining a seat for storage retraction of the conduit means; and
 - (D) a dual valvular control for the conduit means, interposed between the drain line and return line, consisting of first and second actuating valves having common hydraulic connection to a conductor positioned therebetween, said conductor being openly connected to said conduit means, said first valve being disposed in said return line and having a first position connecting said filter to said conductor and a second position connecting said filter with said return line, said second valve being disposed in said drain line and having a first position connecting said drain line to said pump and a second position connecting said conductor to said pump, the conduit means thereby being extended when said valves are in their respective first positions and retracted when said valves are in their respective second positions.
2. The system according to claim 1 wherein said valves have intermediate positions between their first and second positions to vary the hydraulic pressure whereby to control the extension limit and degree of agitation of the conduit means.

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U.S. Cl. X.R.

134—6, 24, 168