

Oct. 18, 1966

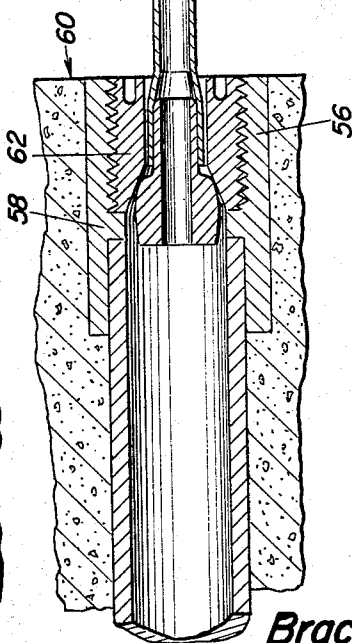
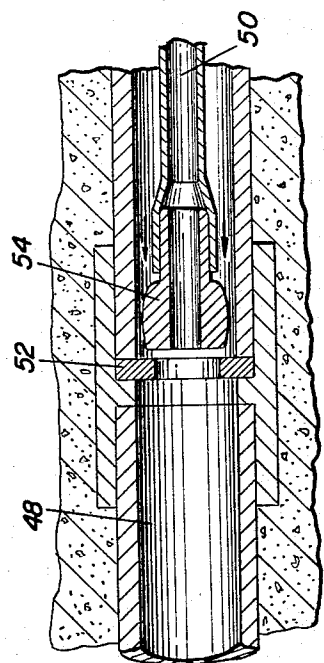
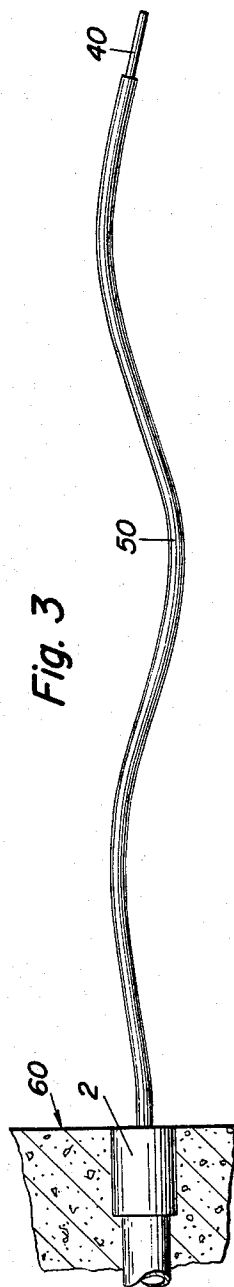
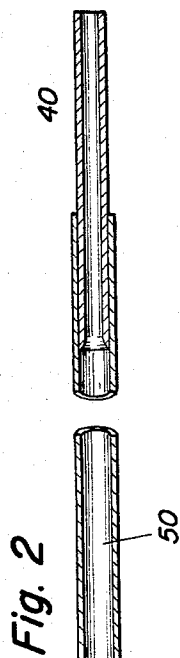
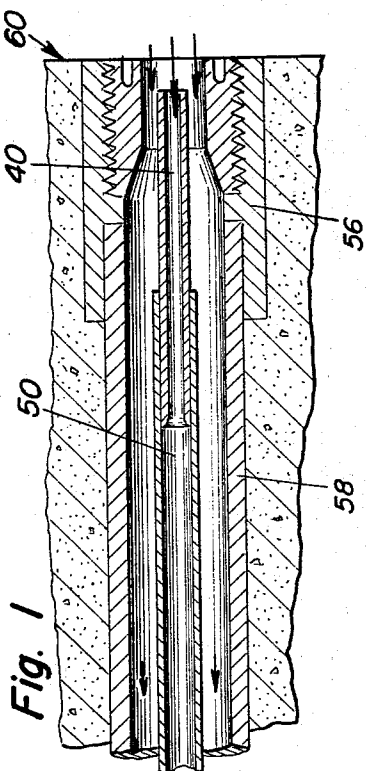
B. T. WHITAKER

3,278,949

SWIMMING POOL CLEANING APPARATUS

Filed Sept. 27 1965

2 Sheets-Sheet 1



INVENTOR,

*Brackston T. Whitaker*

by *Semmes & Semmes*  
ATTORNEYS

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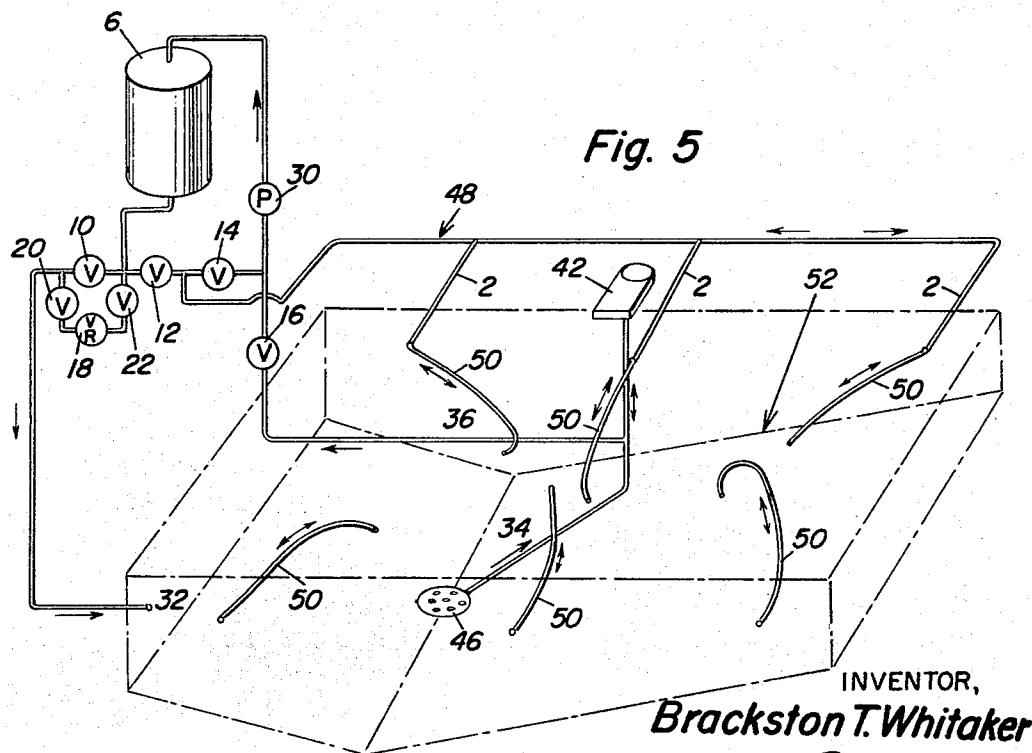
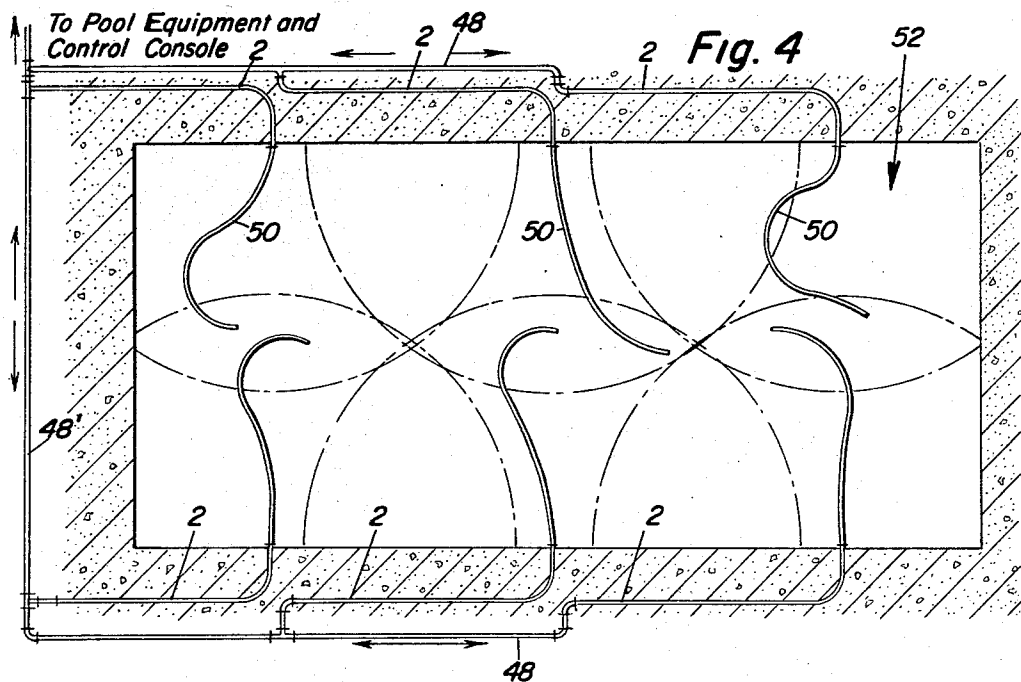
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# SWIMMING POOL CLEANING APPARATUS

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2 Sheets-Sheet 2



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SWIMMING POOL CLEANING APPARATUS

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7 Claims. (Cl. 4-172)

This application concerns a device for cleaning swimming pools, which may automatically be ejected into the pool, and then removed when not in use.

Conventional swimming pool cleaners have previously utilized a tubular flexible water conduit or whip provided with an outlet nozzle, whereby flow of water through said outlet nozzle, causes a jet reaction effect resulting from the water ejection. The nozzle end and adjacent whip lengths usually rest on the floor of the pool with the opposite end of the conduit attached to a water supply source

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to the pool filter system, said view further illustrating the water flow for the various operating phases of the valve controls.

As illustrated in FIGURES 3-5, the whip housing 2 are built into the walls of swimming pool 52, and extend out from the sides of the pool into the surrounding earth. FIGURE 5 discloses the flow chart, of the water supply, for the three phases of operation: (1) Normal; (2) Cleaning Whips Operating; and (3) Cleaning Whips Retracted.

As shown in FIGURE 5, a plurality of valves 10-22 regulate and determine the operating phase of the pool cleaning and filtering system. Valves 10, 12, 14 and 16 are either in the open or closed position and pressure regulating valve 18 is variable to regulate the amount of water shunting valve 10 and therefore the water pressure. The state of the particular gates during each of the three phases of operation, is illustrated by the following table:

VALVE POSITION-VARIOUS OPERATIONAL CONDITIONS

| Valve No. | Type                     | Normal Operation | Cleaning Whips Operating | Cleaning Whips Retracted |
|-----------|--------------------------|------------------|--------------------------|--------------------------|
| 10        | Valve                    | Open             | Closed                   | Open                     |
| 12        | do                       | Closed           | Open                     | Closed                   |
| 14        | do                       | Open             | Closed                   | Open                     |
| 16        | do                       | do               | Open                     | Restricted               |
| 18        | Valve Pressure Regulator | Closed           | do                       | Closed                   |

such as the outlet of the pool purifying and circulating system. The jet reaction force causes the conduit to oscillate in the pool, thereby causing sediment and other accumulations of foreign matter from all submerged surfaces of the pool to be dispersed in the pool water, for subsequent removal by normal actions of the swimming pool filtering system.

The prior art, however, does not disclose automatic means, responsive to water flow for extending and retracting the whips. For example, U.S. Patent No. 2,919,027 teaches the concept of placing a cart on the side of a pool, with the whips being rolled off the cart. On the other hand, U.S. Patent No. 2,975,791 teaches the use of a float to support the gyrating whips. Other patents disclose the method of supporting the whips in which the whips extend from a cylinder supported by springs attached to the sides of the pool. However, I have not discovered any device such as mine, wherein automatic means responsive to water flow for extending and retracting the whips, are disclosed.

It is therefore an object of invention to provide a swimming pool cleaning device which is automatically actuated to cause whips to be extended into the pool, and which said whips being automatically removed from said pool when said water flow is interrupted.

It is another object of invention to provide a novel housing to house said whips when they are not in use, that is, when they are removed from the pool.

It is another object of invention to provide a novel whip actuator piston device, which is activated and deactivated by water flow.

These and other objects of invention will be apparent from the following specification and drawings in which:

FIGURE 1 is a cross-sectional view of the housing and whip actuator assembly, with the cleaning whip retracted into the housing;

FIGURE 2 is a cross-sectional view of the housing and whip actuator assembly, with the whip extended into the pool in cleaning position;

FIGURE 3 is a cross-sectional view, showing the pool wall and whip, when the whip is extended into the pool;

FIGURE 4 is a top view of the pool, showing the various oscillation of the whips within the pool;

FIGURE 5 is a perspective view of the pool and whip assembly, the whip assembly being shown as connected

Thus, it can be seen, that in Normal Operation when the whips are not being utilized, the water will be pumped by pump 30, through filter 6, through open gate 10 and pipe 8, and into the pool through filtered water return 32. The drained water will then flow through pipe 34 into pipe 36, and will then pass through open gate 16 and return to pump 30. As it progresses through the filter 6, any sediment present will be filtered out and clean water will be returned to the pool through the filtered water return 32.

In the cleaning operating cycle the valves are placed in the state indicated in the Cleaning Whips Operating position. Valves 10 and 14 will be closed, and valves 12, 16 and 18 will be open. In this operating phase or condition, water will flow from pump 30 through filter 6, through open valve 12, through the whips and nozzle and into the water. This will cause the whips to be automatically ejected to the water, as will hereinafter be explained. The gyrating effects caused by the whips, and more particularly by the water being ejected through the end nozzle 40 of the whips, will cause the whips to oscillate through the water. This will cause sediment and other foreign matter in the pool water to be dispersed. The dispersed matter that floats to the top of the pool will be picked up by skimmer 42 and return through pipes 44 and 36 through open valve 16 to the pump 30. The sediment hereinafter will then be filtered out by filter 6. Also, foreign matter that goes to the bottom of the pool will be drained and any foreign subject matter caught will travel through pipes 34 and 36 through open valve 16 to the pump 30 and will be filtered by filter 6. Clean water is then returned through pipe 8 into the filtered water return 32 of the pool.

At the completion of the cleaning cycle the whips are in retracted position and the position of the gates are illustrated in the third column above. Thus gates 10 and 14 will be open, whereas gates 12 and 18 will be closed. On the other hand, drain 46 and thus gate 16 will be restricted. Under these conditions, the water flow is from pump 30 through filter 6, through open valve 10 and pipe 8, through the filtered water return 32 and into the pool. Because valve 16 is restricted, water will not be able to flow from the drain through gate 16. Instead, it will flow through the housing 2 and cleaning whips 50, through pipes 48 and 48' through open

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valve 14 to pump 30 thereby completing its cycle. Of course, when water is thus forced in the reverse direction, as opposed to the Cleaning Whips Operating direction, through the cleaning whips 50, it will serve to retract the cleaning whips into the housing 2, as will herein-  
 5 after be described. Thus, the retraction of the cleaning whips into the housing is completely automatic, and is accomplished by merely manipulating several valves.

The operation of the automatic means by which the cleaning whips 50 are ejected and retracted into and out of the pool, is illustrated in FIGURES 1 and 2. FIGURE 2 shows that housing 2 is enclosed within the sides of pool 60, the side of the pool being illustrated by element 60. Thus whips 50 and nozzle 40 are completely enclosed within the side of the pool when not in use, so that they do not interfere with the use of the pool, and especially do not present any safety hazards to swimmers.

As illustrated in FIGURE 1, pipe 48, which is attached via various valves to pump 30, is securely fitted into housing 2. FIGURE 2 shows the whips extending into the side 60 of the pool. Pipe 48 feeds the whips, and the direction of the flow of water through pipe 48, depends upon the condition of the valves. Pipe 48 and 48' are securely coupled to housing 2.

When the direction of the flow of water through pipe 48 is from left to right in FIGURE 1, the water pressure flowing through pipe 48, and through the hole in whip retainer ring 62 is of sufficient pressure so that when it strikes cylindrical whip actuator piston 54, and which is securely fitted over the ship as illustrated in FIGURES 1 and 2, it forces whip actuator piston 54 to the right and towards the side 60 of pool. Also, of course, as this is happening, part of the water will flow through the tube. However, the pressure of the water flow exerted on whip actuator piston 54 is sufficient to force the whip actuator piston to the extreme right, and to the position as illustrated in FIGURE 2. At this position, the whip 50 and nozzle 40, extend completely into the pool.

The whip actuator piston 54 is prevented from going into the pool by ejector coupling 56. As illustrated in FIGURES 1 and 2, ejector coupling 56 is securely fitted over tubular jacket 58 and completely encloses the whip actuator piston and whip assembly, and is securely fitted in housing 2. Ejector coupling 56 is cylindrically hollow in form, and is securely mounted to annular ring 58. The right end bore of ejector coupling 56 is threaded, to retain retainer plug 62, which is removable by simply being screwed out. The retainer plug is tapered and its average diameter is smaller than that of whip actuator piston 54 so that it retains the piston. Also the tapering of the retainer plug 62 counteracts shortening of the whip, either because of wear or intentional shortening, to create a more efficient cleaning pattern. However, the whip diameter is small enough to enable the whip to pass through the retainer plug and into the pool. When the whip is fully extended into the pool, all of the water from pipe 48 passes through the whips.

Under these conditions, when the whip is inserted in the pool and all of the water flowing from pipe 48 flows through the whips, the whips will oscillate through the water, and will thereby stir up any sediment or other foreign matter present. Foreign matter, will then be pumped through the filter, and reintroduced into the pool through the filtered water return 32, as previously described. The release of all water from pipe 48 through the whips 50 causes the whips to gyrate along and around the floor of the pool, forcing the dirt and other debris into suspension by hydraulic action from the jet, and by the movement of the tube over the floor of the pool.

The piston is slightly curved which allows it to turn bends in the housing without binding. Also, the diameter of the piston is slightly smaller than the inner diameter of the housing tube. This allows for a flow of current between the outside of the whips tubular

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jacket 58 and around the piston, which helps the whips to be ejected and retracted in and out of the housings. This makes it very easy to retract the whip. Whip actuator piston 54 may be grooved in a spiraling direction, so as to cause the whip to seat in a different position each time it is extended. This will result in longer whip life.

I have found that the whips perform better if the nozzles have a higher specific gravity than the water. Under these circumstances, the back pressure on the nozzle caused by the water striking the comparatively static pool water, causes the whip to sweep through the pool in a controlled manner. However, even if the specific gravity of the nozzle is not greater than that of the water, it is possible to prevent uncontrolled turbulence by weighting the whips. Also, it is sometimes desirable in certain positions of the pool, as for example, around corners, that the tubes do not stay on the sides or bottom of the pool.

The length of the housing and whips can vary to create the proper cleaning action. Normally they will be 8 to 16 feet long, however, they can be made substantially smaller if desired. Also the diameter of the housings and/or the whips, and pipes, can vary for different installations, depending upon the volume of water available for cleaning action, and also upon the size of the pool to be cleaned. The housing and pistons can be made from a variety of materials, for example metal or plastic. The normal construction will be plastic. The whip itself is made from vinyl plastic tubing; however, rubber and many other materials are suitable, but must be weighted to create the desired oscillating action in the pool. I have shown six whips, but more or less may be used as is necessary or desired.

Other modifications of my invention are also possible. For example, a standard vacuum hose used in normal swimming pool vacuuming may be extended and retracted into a two inch diameter housing built in the side of the pool, using the same principle of water ejection and retraction, as is used on the whips.

The advantages of my particular swimming pool cleaning device, is that it can be connected to the filter system already installed on existing swimming pools. Also, the whip mechanism can be retracted easily when bathers want to use the pool, as desired. Furthermore, it increases the leisure time available, since the operation is completely automatic.

My device is also efficient, since it does not need a separate pump, nor does it need an increase in filter or pump size for normal operation. It can be installed with any adequate filter system, and can be operated full time or for short intervals, as desired. Thus my system is compatible with existing filter and pump systems, and can be easily fitted to such systems, by the mere addition of a few valves. Also, a heating system can also be utilized since my cleaning system will not interfere with it.

Having thus described my invention, I claim the following:

I claim:

1. A swimming pool cleaning apparatus, which comprises:

- (A) a plurality of hollow tubular whips;
- (B) a source of water connected to said whips;
- (C) regulating means to regulate the direction of flow of water from said source through the hollow whips;
- (D) automatic means responsive to the flow of water through said whips, to extend and retract said whips into and out of the swimming pool, depending upon the direction of water flow through said whips.

2. A swimming pool cleaning apparatus as described in claim 1, wherein said whips are attached to the pump and filter system of the swimming pool through a plurality of valves, and wherein said regulating means comprises a

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plurality of valves, the operating states of said valves, determining the flow of water through said whips.

3. A swimming pool cleaning apparatus as described in claim 2, wherein said automatic means comprises:

(A) a hollow piston securely attached to one end of each whip;

(B) a water jacket enclosing said whip and said water piston;

(C) an ejector coupling securely mounted on one end of said jacket, and a housing mounted on the other end of said jacket, said housing having a retaining plug therein; said housing, jacket and ejector coupling being completely mounted in the side of the pool;

(D) a removable retaining plug mounted in said ejector coupling, said housing ejector coupling jacket and retaining plug being cylindrically hollow, and of sufficient diameter to permit the whip to slide freely therethrough;

(E) a source of water connected to the input of said housing, so that when water flows from said source of water into said housing and whip, it strikes said piston and forces it and said attached whip across said water jacket until it hits said removable retaining plug, whereby the whip is automatically extended into the pool.

4. The swimming pool cleaning apparatus as described in claim 3 wherein a nozzle is connected to each of said whips, whereby when water flows from said source through said extended whips and out the nozzle and into the pool, the jet of water emitted from the nozzle striking the static pool water, causes a jet reaction which cause gyration of the whips to thereby disperse any foreign matter in the pool, whereby it may be picked up by the filtering system.

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5. The swimming pool cleaning apparatus as described in claim 4 wherein said source of water is fed by a pump through a filter, and wherein water is drained from said pool during the operation of said whips, and is filtered through said pump and returned through a filtered water return into the pool.

6. The swimming pool cleaning apparatus as described in claim 5 wherein a skimmer picks up foreign matter from the surface of said pool and feeds it to the filter for removal thereof.

7. The swimming pool cleaning device as described in 5, wherein reversal of the direction of water flow from the swimming pool through and around whip, forces said piston and attached whip through said water jacket until said piston is retracted to a position wherein the piston is retained by said retaining ring whereby the whip is fully retracted into the side of the pool.

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