

Sept. 1, 1964

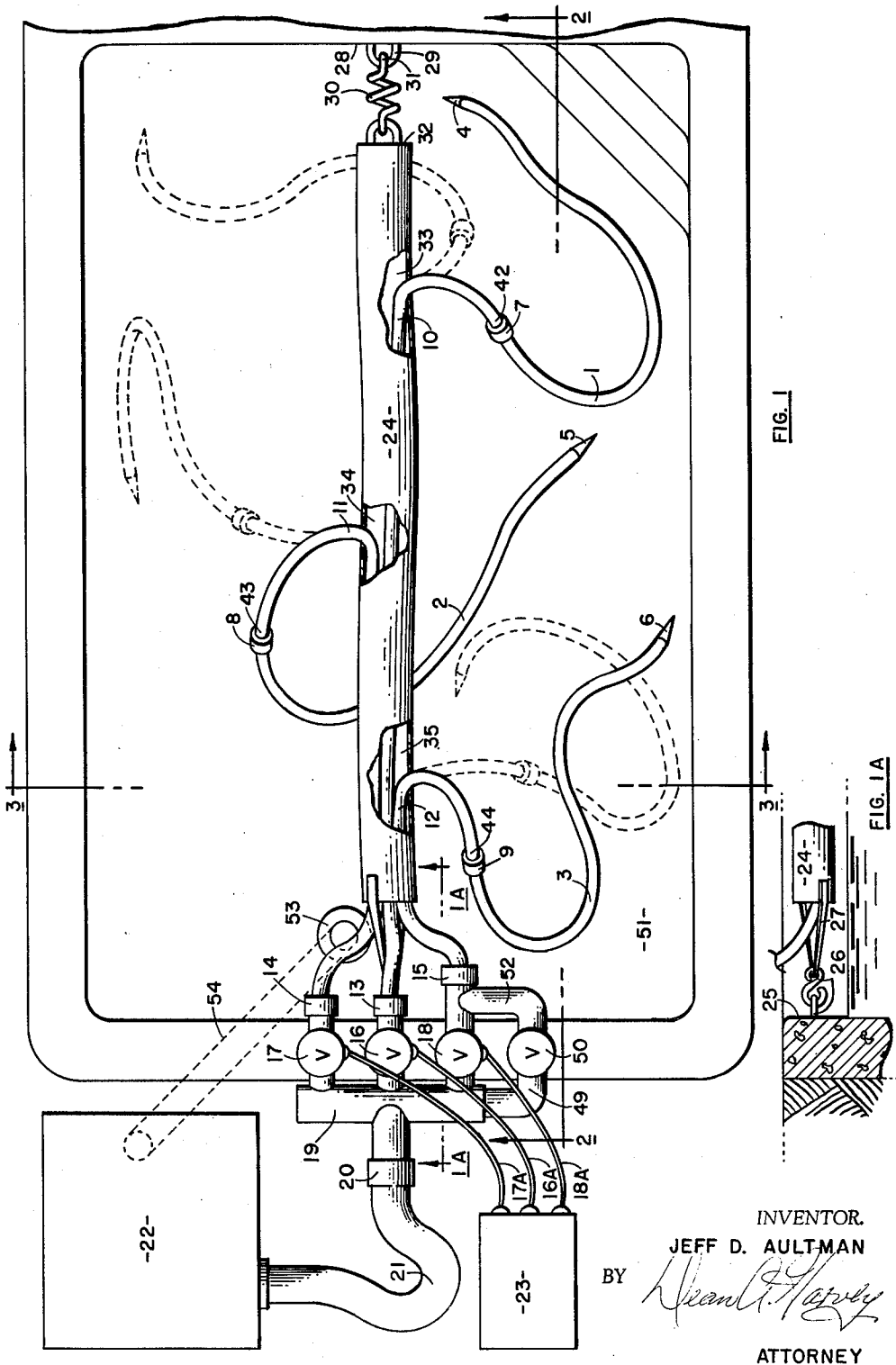
J. D. AULTMAN

3,146,783

AUTOMATIC SWIMMING POOL CLEANING APPARATUS

Filed April 16, 1962

2 Sheets-Sheet 1



INVENTOR.

JEFF D. AULTMAN

BY

Heenan C. Harper

ATTORNEY

Sept. 1, 1964

J. D. AULTMAN

3,146,783

AUTOMATIC SWIMMING POOL CLEANING APPARATUS

Filed April 16, 1962

2 Sheets-Sheet 2

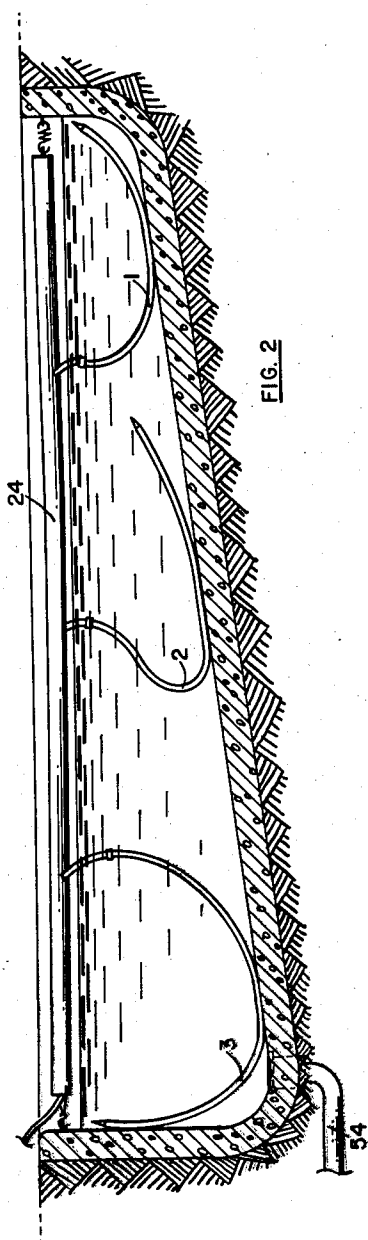


FIG. 2

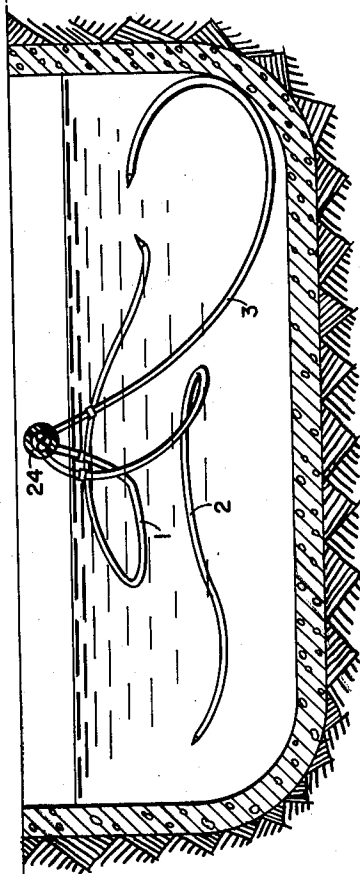


FIG. 3

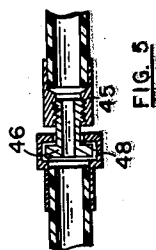


FIG. 5

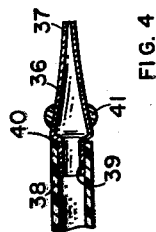


FIG. 4

INVENTOR.
JEFF D. AULTMAN
BY *Alan A. Harvey*
ATTORNEY

1

3,146,783

AUTOMATIC SWIMMING POOL CLEANING APPARATUS

Jeff D. Aultman, 8075 Maple Drive, Buena Park, Calif.,
assignor of two-thirds to J. B. Sebrell, Compton, Calif.
Filed Apr. 16, 1962, Ser. No. 186,306
8 Claims. (Cl. 134-168)

This invention pertains to swimming pool cleaning apparatus generally, and more particularly to an improved device for performing this function automatically.

Presently, the art provides apparatus of the nature described which employs a water spray discharged from the orificed or nozzled end of a flexible hose to agitate and maintain in suspension the dirt, sediment and debris which collects in the pool so that such unwanted substances are collected by the filtering system for removal from the pool water.

The present invention in its preferred form, contemplates a series of such flexible hoses, positioned at strategic locations throughout the pool so that their orificed ends, under the influence of water discharged under pressure through their respective orifices, are caused to "sweep" the entire underwater surfaces of the pool to the end that the dirt sediment and debris is removed therefrom and "swept" along the bottom of the pool to the filter drain. The water delivered through the several flexible hoses is supplied from the pool filter pump through a manifold to which is connected a valve individual to each hose. The several valves, in turn, are operated by a timer which is conditioned to operate the valves sequentially so that the hose servicing the shallow end of the pool is turned on first for a period of time, is then turned off and the second hose is turned on for a period of time, with the steps repeated for the other valves and their hoses in progressive order from the shallow to the deep end of the pool.

In the prior art devices, separate or auxiliary means is provided for moving and positioning the flexible hoses about the pool so that the side walls and bottom of the pool are reached by the water discharged from the nozzle ends thereof. In all instances, however, the devices employed are complex in nature, expensive to manufacture, unwieldy to handle and operate, bulky to store, and costly to maintain.

Accordingly, it is the principal object of this invention to provide an automatic swimming pool cleaning device which overcomes the foregoing disadvantages of the prior art, and additionally, places at the disposal of the user, apparatus which can be readily adapted to existing pools, can be placed in operation, removed, and stored with a minimum of physical effort, making its use available to all members of the household, including women and children.

It is a further object of the invention to provide apparatus of the class described which requires no auxiliary means for moving or positioning the flexible hoses thereof about or in the pool.

A still further object of the invention is to provide apparatus of the class described which leaves the open deck surfaces of the pool free and unencumbered when mounted on the pool.

Other objects and advantages of the invention will be pointed out in the following specification of which the accompanying drawings form a part and in which:

FIG. 1 is a schematic plan view of the cleaning device mounted for operation on a swimming pool;

FIG. 1A is a detail view of the means for anchoring a portion of the device to the swimming pool wall taken along the line 1A-1A of FIG. 1;

FIG. 2 is a side sectional view of the swimming pool

2

showing parts of the device mounted therein taken along the line 2-2 of FIG. 1;

FIG. 3 is an end sectional view of the swimming pool showing parts of the device located therein taken along the line 3-3 of FIG. 1;

FIG. 4 is a detail view of a nozzle used in the device; and

FIG. 5 is a detail view of a swivel used in practicing the invention. Like reference numerals have been used in the different views to designate like parts.

As illustrated in FIG. 1, the invention comprises a series of flexible hoses, which for descriptive purposes only, are three in number, designated by the numerals 1, 2 and 3, each of which has at the free end thereof, respectively, a nozzle 4, 5 and 6 taking a form shown in FIG. 4. To each of the said flexible hoses, and individual thereto, there is connected, by means of a swivel respectively numbered 7, 8 and 9, a supply line 10, 11 and 12. The latter, in turn, are connected respectively by suitable means 13, 14 and 15, through valves 16, 17 and 18, to a manifold 19. The manifold 19, has connected to it through suitable means 20, a main supply line 21, which receives water under pressure from a source, such as a pool filter 22.

Controlling the valves 16, 17 and 18, through the electrical connections 16A, 17A, and 18A, which in their illustrated embodiment take the form of solenoid operated valves, is a timer 23. Neither the valves nor the timer need take any particular form but may be one of the various different makes commercial available on the open market.

The supply lines 10, 11 and 12 are suspended above the water in the pool (FIGS. 1 and 2) in a flexible casing 24, which, at one end thereof, is anchored to a wall 25 of the pool by means of a hook and eye 26 and a sling 27 (FIG. 1A). At its other end, the casing 24 is attached to another pool wall 28 (FIG. 1) by an eye 29, a tension spring 30 having one end thereof formed in the shape of a hook 31, and a connector 32. By making openings in the casing 24 at suitable locations such as 33, 34 and 35, the hoses 1, 2 and 3 are spaced in the pool so that, by giving them suitable length, all areas of the underwater surfaces of the pool, both the walls and bottom, are traversed, at one time or another within their prescribed limits, by the nozzles 4, 5 and 6, as illustrated in FIGS. 1, 2 and 3.

The nozzles 4, 5 and 6 may take any suitable form of the restricted orifice type, such as is illustrated in FIG. 4. Here a tapered copper tube 36 terminating in a flat restricted orifice 37 is shown. The hose end of the nozzle 38 has a friction surface 39 which retains the nozzle in the hose and provides for a quick slip connection therewith. The length of the nozzle is such that a portion thereof extends beyond the end 40 of the hose to provide a surface for receiving a weight 41, taking the form of applied solder, whose purpose and function will be described later in connection with the operation of the device.

Likewise, the swivels 7, 8 and 9 may take any suitable form which will allow the flexible hoses 1, 2 and 3 to turn freely about the ends 42, 43 and 44 respectively designated, of the supply hoses to which each is connected. In the illustrated form (FIG. 5) the swivel comprises a first hose connector 45 having a male portion 46 thereof extending into a female hose connector 48 and about which the latter is free to rotate. The swivel may be of the sealed type but such is not necessary since leakage at the joint, in the interest of economy, is not objectionable.

Connected to the manifold 19 by a line 49 is a low pressure by-pass valve 50, which allows the filtered water supplied from the filter 22 to be discharged into the pool 51 through a line 52, the supply hose 12, and the flexible

hose 3, when the valves 16, 17 and 18 are closed all in a manner to be described later.

In the embodiment of the invention illustrated, which shows only one of the numerous arrangements by means of which it may be practiced, the manifold 19, the valves 16, 17, 18 and 50, together with the timer 23 may be contained in a single unit, which, for adaptation to presently existing pools and in the interest of keeping the deck surface thereof free from encumbrances, may be located under a diving board. With the remaining portions of the apparatus mounted on the pool as illustrated, all that is required to complete hook-up of the apparatus is to attach the main supply line 21 and the supply hoses 10, 11 and 12 to the single unit described (not shown) by means of the respective connectors 20, 13, 14 and 15 and the device is ready for operation.

During times when pool cleaning is not required the supply lines 10, 11 and 12, as contained in the flexible casing 24, are disconnected at 13, 14 and 15, the casing 24 is unhooked from the pool at 29 and 26 and the same together with the flexible hoses 1, 2 and 3 are rolled up in a light weight, compact unit for out-of-the-way storage. Also the main supply line 21 may be rolled up back to the filter 22.

When installed in pools yet to be constructed, the main supply line 21, can be located underground and the manifold 19, the valves 16, 17, 18 and 50 and the timer 23 placed in a readily accessible recessed compartment under the pool deck with the connectors 13, 14 and 15 recessed in the wall of the pool for easy access in connecting the supply hoses 10, 11 and 12.

Irrespective of the type of installation or whether or not the portable part of the device is mounted on the pool for operation, the deck surfaces of the pool are free and clear from any encumbrance insofar as the cleaning apparatus is concerned.

As described herein, the preferred embodiment of the invention employs solenoid operated valves, but it is to be understood that other valves and valve arrangements may be used. For example, manually operated valves for semi-automatic operation may be used or hydraulically operated valves for fully automatic operation, in which latter case an electric timer of the type employed for operation of the hydraulically-operated valves in lawn sprinkler systems would be used.

In performing its swimming pool cleaning function, the apparatus above described operates as follows: Filtered water from a filter pump (not shown), located in the filter 22, is delivered through the main supply line 21, to the manifold 19. When the valves 16, 17 and 18 are closed, the filtered water is by-passed by means of the lines 49 and 52, the supply line 12 and the flexible hose 3 through a low-pressure by-pass valve 50 into the pool 51. The pool water passes into the pool drain 53 and through a return line 54 back to the suction side of the filter 22 where it is filtered to complete the filter cycle all in a well known manner.

The timer 23 is set to cause the energization of the solenoid valve 16, initially, which opens the same to allow the filtered water to flow through the supply line 10 to the flexible hose 1. From the latter the filtered water is discharged out of the nozzle 4. As the filtered water is thus discharged from the hose 1, due to the action and reaction of the forces created thereby, the same is moved about in the pool to an infinite number of positions such as depicted in one instance by the dotted line shown of hose 1 (FIG. 1). In this manner the nozzle 4 is caused to move along the walls and bottom of the pool and throughout the pool water, within bounds determined by the length of hose 1, so that the water discharge from the nozzle cleans the dirt and sediment from the underwater surfaces of the pool and keeps these unwanted substances in turbulence and suspension in the pool water during the time valve 16 is open. Through the action of the pool filter, the dirt and sediment thus maintained in a state of turbulence is moved during the initial portion of

the cleaning cycle from the orbit of influence of the first flexible hose 1 into the orbit of influence of the flexible hose 2. This period of the cleaning cycle may be of any required duration but for the average size pool whose water is contaminated with normal amounts of dirt, thirty minutes has proved sufficient.

At the conclusion of the initial portion of the cleaning cycle, valve 16 is closed and valve 17 is opened. Here the operation of valves 16 and 17 may be simultaneous, but preferably a small interval of time is allowed between the closing of valve 16 and the opening of valve 17. As valve 17 is opened a second portion of the cleaning cycle is begun and flexible hose 2 and nozzle 5 are caused to operate in a manner similar to that described for hose 1 and nozzle 4. This second portion of the cleaning cycle is preferably of the same duration as the first, and, by its action, the dirt and sediment cleaned from the walls and bottom of the pool within the orbit of influence of hose 2, together with the dirt and sediment moved from the orbit of influence of hose 1, is agitated and held in suspension for movement to the filter drain section of the pool, where the third and final portion of the cleaning cycle is accomplished.

In this last instance, the flexible hose 3 and nozzle 6 are moved as for 1 and 4 and 2 and 5, previously described. During this last phase of operation, which may be for the same duration as the two previously described, or longer if necessary, the dirt and sediment carried from the shallow end of the pool to the drain is drawn into the drain 53 and filtered out of the water by the filter 22 to complete the cleaning cycle.

Although a definite number of flexible hoses are shown and a corresponding number of portions of the cleaning cycle described, it is to be understood that the invention may be practiced with greater or lesser numbers, dependent only upon the size of the pool to be cleaned.

Also, it is to be pointed out that the material from which the flexible hoses 1, 2 and 3 is made is not critical. It need only be such that they are sufficiently pliable so as to be moved about, contorted, and carried up and along the walls of the pool by the action of the discharged water previously described.

In practice, it has been found that if this degree of pliability is given to the hoses, they will, when in operation, tend to raise their nozzles above the surface of the pool water and spray water over the deck of the pool. Since this action is objectionable for obvious reasons, the solder weight 41, as previously described, is added to the nozzle to give the same the required balance necessary to allow the same to rise almost to the surface of the pool water but at the same time prevent it from breaking therethrough.

Further, if given the required degree of flexibility, and with no rotatable means for connecting the flexible hose to its supply line, the former will tend to knot up and eventually will become inactive as far as movement about the pool is concerned. Accordingly, the swivel shown in FIG. 5 is interposed between these two members. In this manner, the flexible hose is free to rotate through a full 360 degrees about the end of the supply line to which it is thus attached, allowing the same to describe a full circle "sweep."

As for the supply lines 10, 11 and 12, they may be the same material and pliability as the flexible hoses 1, 2 and 3. All that is required is that they be sufficiently flexible to be easily rolled up in, and along with, the casing 24 in a compact roll.

In an alternate mode of operation, the main supply line 21 may be connected to the house, or domestic, water main and the cleaning apparatus be operated therefrom. In such case the cleaning of the pool may be effected when make-up water is to be added to the pool. If the cleaning operation requires more added water than that needed to fill the pool, the excess water will pass out through the pool overflow.

It is apparent from the foregoing description that many changes may be made in the apparatus described without departing from the intent of the invention. Insofar as such modifications fall within the scope of the appended claims, they are included as if described.

What is claimed is:

1. Apparatus for cleaning a swimming pool, having a pool drain therein, comprising a series of flexible hoses disposed therein to have their free ends reach selected portions of the underwater surfaces of said pool, a source for supplying water under pressure to said flexible hoses, and means for controlling the delivery of water from said source selectively and sequentially to said hoses whereby water under pressure is discharged from the free ends of said hoses sequentially and in progressive order toward said pool drain from a point characterized by the location of one of said hoses.

2. Apparatus for cleaning a swimming pool, having a pool drain therein, comprising a series of flexible hoses disposed therein to have their free ends reach selected portions of the underwater surfaces of said pool, a source for supplying water under pressure to said flexible hoses, valve means interconnected between said source and each of said hoses and means for operating said valve means selectively and sequentially whereby water under pressure is discharged from the free ends of said hoses sequentially and in progressive order toward said pool drain from a point characterized by the location of one of said hoses.

3. Apparatus for cleaning a swimming pool, having a pool drain therein, comprising a series of flexible hoses disposed therein to have their free ends reach selected portions of the underwater surfaces of said pool, a source for supplying water under pressure to said flexible hoses, a separate supply line connecting each of said hoses with said source, a valve connected in each of said supply lines for controlling the flow of water to the hose connected thereto, means responsive to a control force for opening and closing each of said valves, a timing device for supplying said control force whereby said valves are alternately opened and closed to discharge water under pressure from the free ends of said hoses sequentially in progressive order toward said pool drain from a point characterized by the location of one of said hoses.

4. Apparatus for cleaning a swimming pool, having a filter system including a main supply line for delivering filtered water to said pool and a suction line connected to a drain located at the bottom of said pool, connected to said main supply line and comprising a series of flexible hoses disposed in said pool to have their free ends reach selected portions of the underwater surfaces of said pool, a source for supplying water under pressure to said flexible hoses, and means for controlling the delivery of water from said source selectively and sequentially to said hoses whereby water under pressure is discharged from the free ends of said hoses sequentially and in progressive order toward said pool drain from a point characterized by the location of one of said hoses.

5. Apparatus for cleaning a swimming pool having a filter system operable therewith comprising a series of flexible hoses each of which has an end thereof held in a fixed position with respect to said pool and a free end movable to reach selected portions of the underwater surfaces of said pool, a source for supplying water under pressure to said flexible hoses whereby water is discharged out of each of the free ends of said hoses, and means for controlling the delivery of water from said source selectively and sequentially to said hoses whereby the same are moved about in said pool to agitate and hold in suspension

foreign substances contained in the pool water so that said foreign substances are removed therefrom by said filter system.

6. Apparatus for cleaning a swimming pool having a filter system operable therewith comprising a series of flexible hoses suspended into said pool at selected fixed points from a casing having its opposite ends removably attached to separate walls of said pool, a source for supplying water under pressure selectively and sequentially to said flexible hoses, orifice means in the ends of said hoses whereby water is discharged therefrom to agitate foreign matter contained in the water of said pool and maintain said foreign matter in suspension for movement into and removal by said filter system.

7. Apparatus for cleaning a swimming pool having a drain therein, comprising a series of flexible hoses disposed in said pool to have their free ends reach selected portions of the underwater surfaces of said pool, a source for supplying water under pressure to said flexible hoses, nozzle means positioned in each of said flexible hoses at the free ends thereof for discharging water into said pool whereby foreign matter contained in the water of said pool is agitated and maintained in suspension, separate valve means connected between said source and each of said flexible hoses, separate means responsive to a control force for opening and closing each of said valves, a timing device for supplying a control force to each of said valve opening and closing means in sequence whereby the first of said valves is opened for a period of time and is then closed, the second of said valves is then opened for a period of time and then closed and such action repeated for all other valves in predetermined order to the end that said foreign matter is moved progressively toward said drain.

8. In combination with a swimming pool having a filter system for delivering filtered water to said pool and drawing dirt bearing water from said pool through a drain in said pool, an automatic cleaning device comprising a series of flexible hoses disposed at predetermined fixed points in said pool each having a free end capable of reaching selected portions of the underwater surfaces of said pool, a nozzle located in the free end of each of said hoses, a manifold connected to receive filtered water from said filter system, separate supply lines connected between said manifold and each of said flexible hoses, separate valve means interposed between said manifold and each of said supply lines, connecting means interposed between each of said supply lines and the flexible hose to which it is connected having a first member about which a second member is rotatable to allow said flexible hose to rotate about an end of said supply line, means detachably connected to separate walls of said pool for suspending said supply lines and said flexible hoses, means responsive to a control force for opening and closing each of said valve means and a timing device for delivering a control force to each of said valve opening and closing means in a predetermined order whereby filtered water is discharged from each of the nozzles sequentially to agitate and hold in suspension said dirt for movement toward said drain.

References Cited in the file of this patent

UNITED STATES PATENTS

935,201	Hallauer	Sept. 28, 1909
2,372,205	Hertz	Mar. 27, 1945
2,537,904	McAllister	Jan. 9, 1951
2,975,791	Pansini	Mar. 21, 1961
3,032,044	Pansini	May 1, 1962

FOREIGN PATENTS

361,049	Great Britain	Nov. 19, 1931
---------	---------------	---------------