

June 30, 1964

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3,139,099

SWIMMING POOL CLEANER CONSTRUCTION

Filed July 1, 1963

3 Sheets-Sheet 1

FIG. 1.

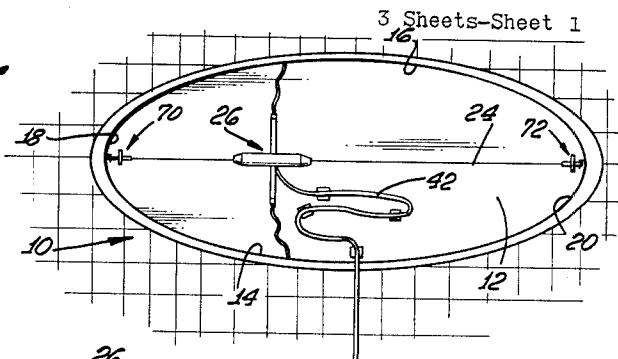


FIG. 2.

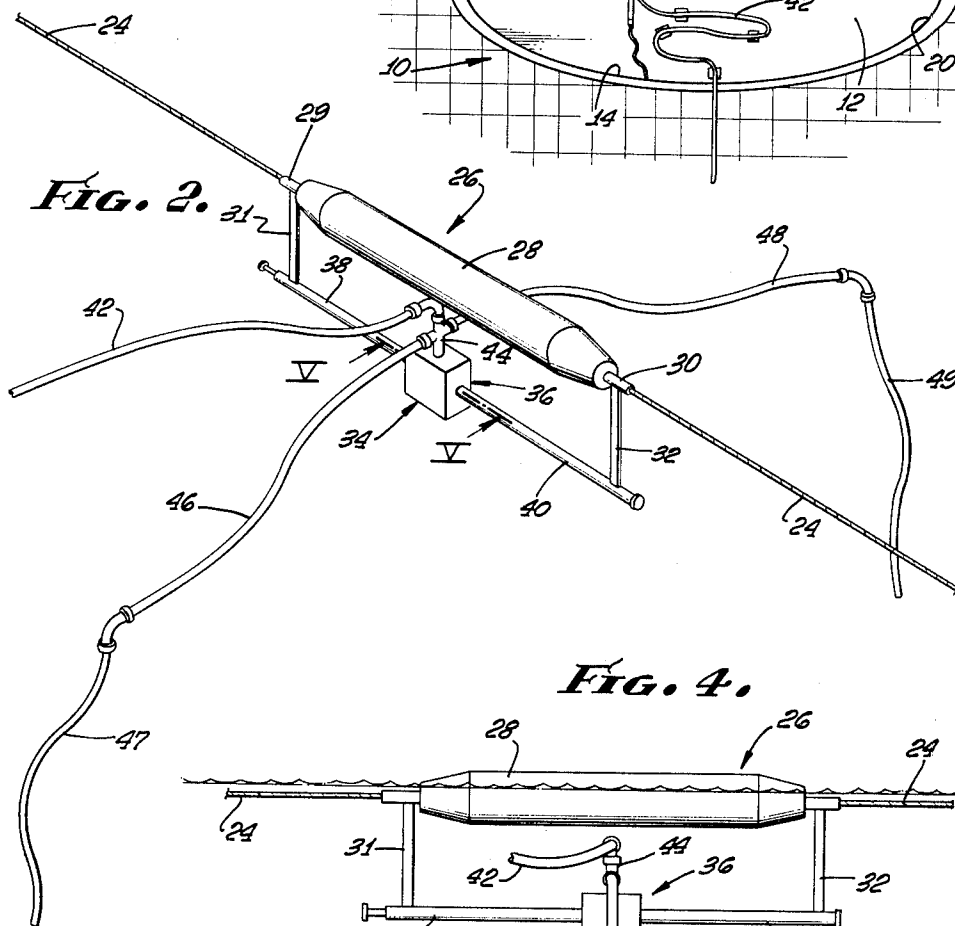


FIG. 4.

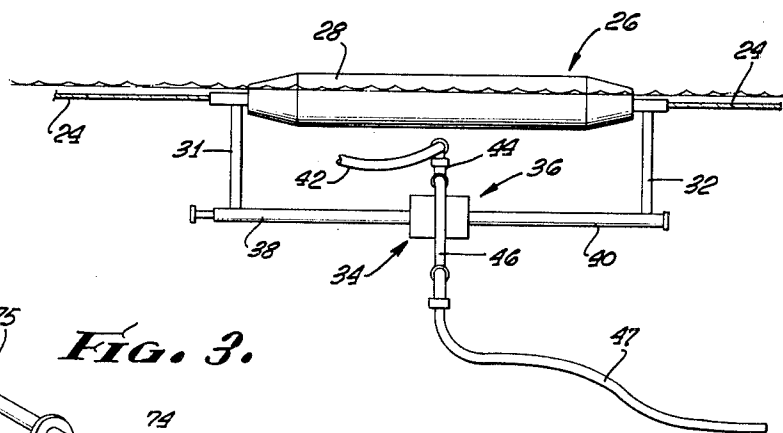
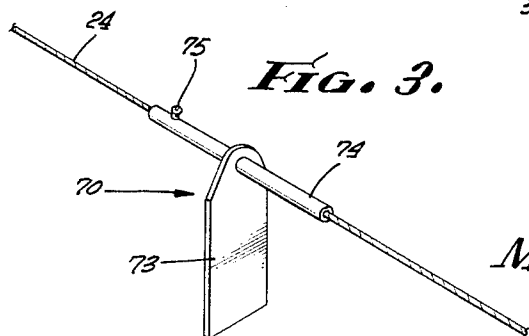


FIG. 3.



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FIG. 5.

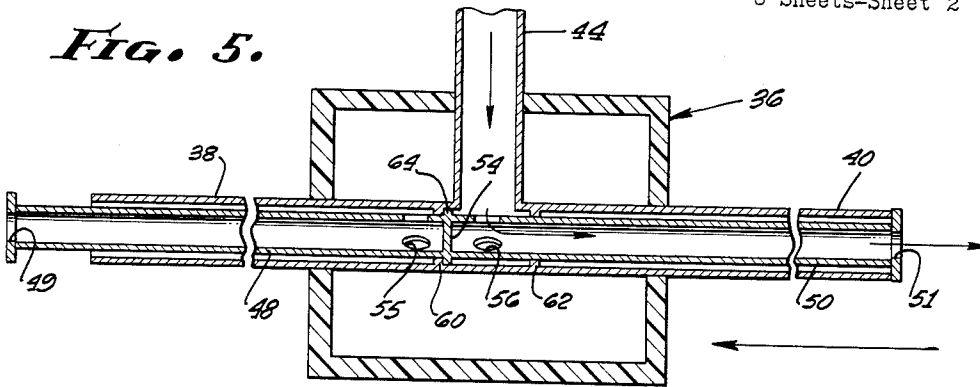


FIG. 6.

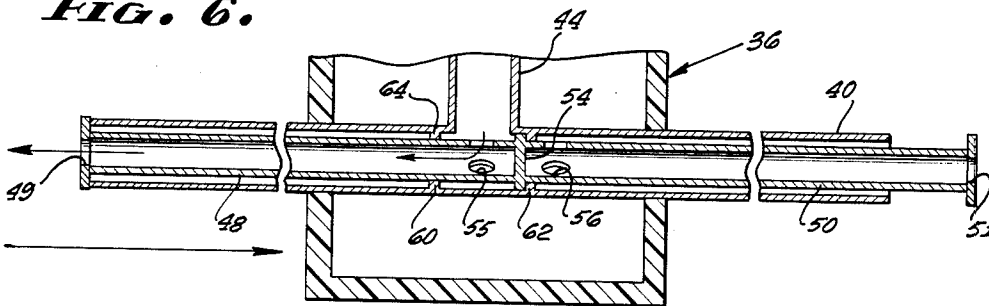
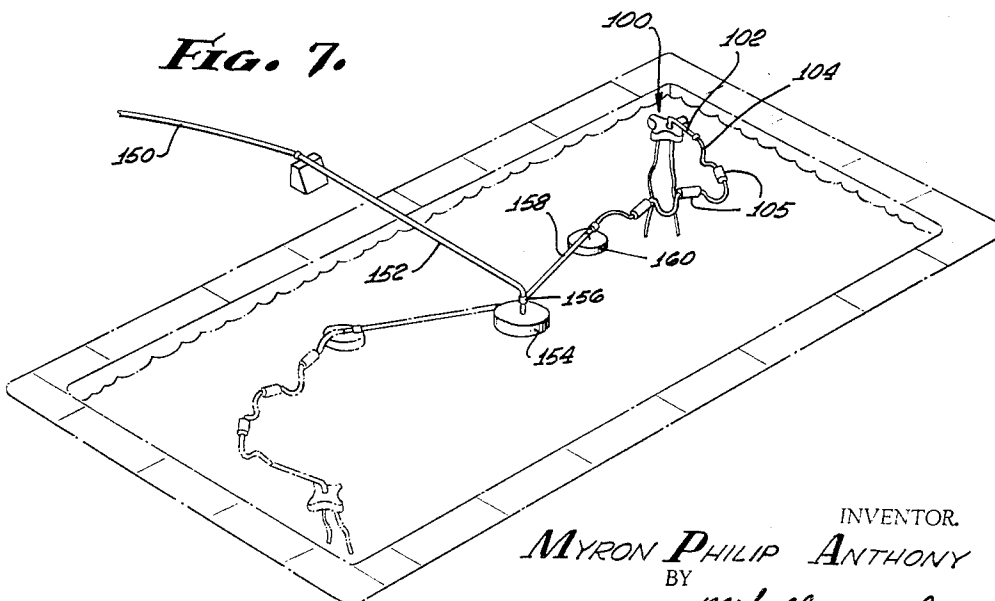


FIG. 7.



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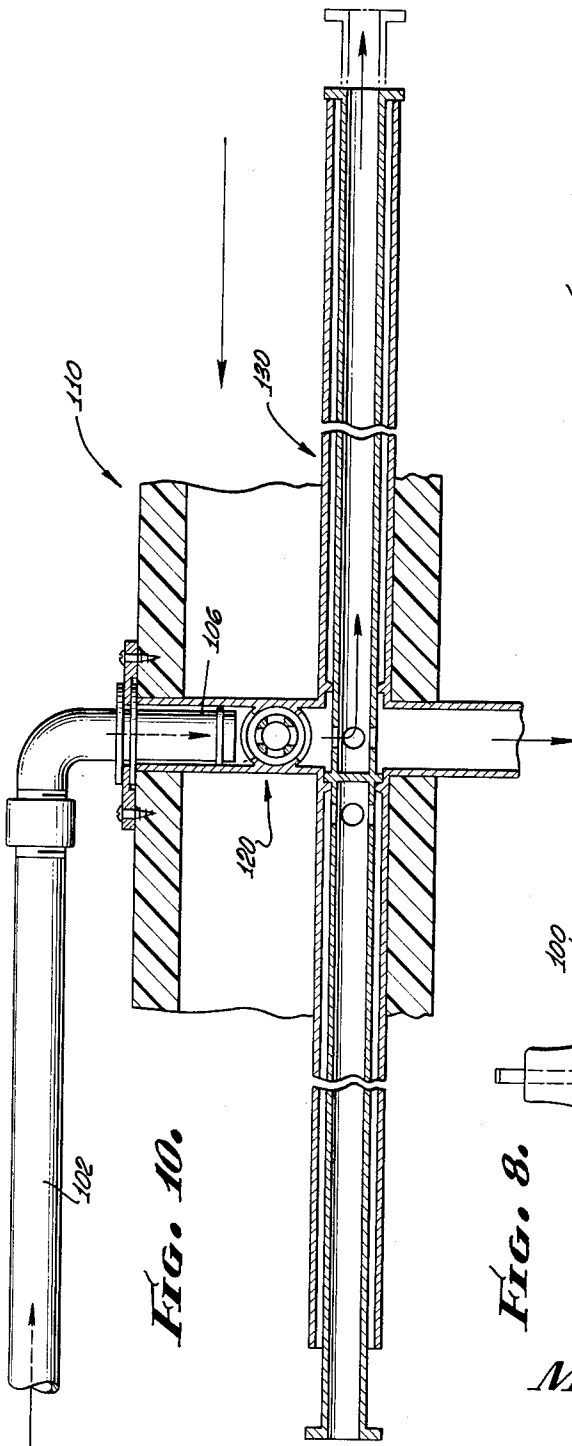
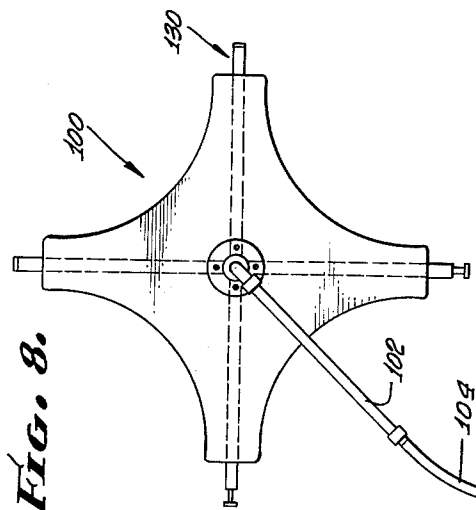
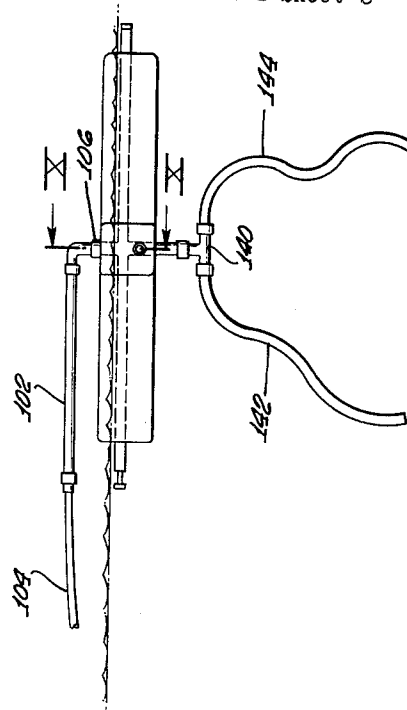


Fig. 9.



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SWIMMING POOL CLEANER CONSTRUCTION

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6 Claims. (Cl. 134—167)

The present invention relates generally to apparatus for cleaning relatively large bodies containing liquid such as swimming pools, and more particularly describes apparatus including one or more hoses moved by a leader float adapted to propel itself on the surface of the liquid, and including means for changing the direction of movement of such leader float.

In an illustrative embodiment of the invention hereinafter described and illustrated in detail, there is provided a leader float made of any suitable buoyant material and provided with a water inlet opening for receiving water under pressure from a source. Carried by the float are propelling means including a pair of pipes connected to the water inlet opening and terminating in generally oppositely directed jet orifices for discharge of water therefrom. Means are provided within the path of water flow from the inlet opening for diverting water into one or the other of the pipes, so that water discharges from only one of the orifices at any one time. The diverting means so blocking water flow to one or the other of the outlet orifices is shiftable between either of two positions, and shifting from one position to the other is caused by the striking of the temporarily inoperative orifice against a barrier of some kind. Typically the barrier may be the side wall of the pool, or a limit or stop member fixed relative to the pool in the path of travel of the leader float.

The form of the invention just described desirably includes guide means for maintaining the float on a single predetermined path extending generally longitudinally of the pool. Such guide means include a cable or the like extending lengthwise of the pool substantially central thereof. The cable extends slidably through the float, to permit free longitudinal movement of the float relative to the cable.

One or more flexible hoses are connected to the float at their upper ends and supplied with water from the float inlet opening. Movement of the float serves to lead the upper hose ends, permitting the hoses to move sinuously through the water under the influence of the reactive force developed by discharge of water from the lower ends of the hoses. Depending upon the size and shape of the pool, there may be provided one or more rigid pipes projecting laterally from the float proper, and the hoses are connected to the outer ends of the pipes in order to position the hoses in appropriate areas of the pool to be cleaned. By the sinuous random movement of the flexible end portions of the hoses, the water issuing from the orifices at the outer ends of the hoses is directed against various portions of the pool bottom and side walls, dislodging therefrom dirt, algae and the like. Such dislodged elements enter the recirculation and filtration system of the pool and are thereby removed from the pool water.

In another form of the invention, particularly adapted for use in larger pools and in pools which are other than generally rectangular in shape, the guide means such as the cable just described is eliminated, and the leader float is provided with at least two angularly spaced pairs of oppositely directed jet orifices. In a typical embodiment in accordance with this form of the invention, the two pairs of oppositely directed orifices are disposed generally in quadrature. Any two adjacent jet orifices may be operative at any one time, in which case the float will

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move generally in the direction vectorially determined by the reactive force from the two operative jets, modified by the drag on the float. Thus the movement of the leader float in accordance with this form of the invention is essentially random around the surface of the pool. As the case of the form of the invention first mentioned above, one or more dangling hoses are carried by the float and supplied with water at their upper ends from the water inlet opening of the float. The hose or hoses so carried contort themselves sinuously as the leader float moves, so that the outer jet discharge ends of the hose or hoses serve to clean the bottom and side walls of the pool in the manner above referred to.

Water from a suitable source may be supplied to the first form of the invention by a hose having a series of spaced floats, or by a hose which is itself buoyant, extending from the side of the pool to the float. In the form of the invention permitting nomadic movement of the leader float, water may be supplied thereto from a supply float disposed generally centrally of the pool, water being conveyed to the supply float by a pipe spaced above the water by a sufficient distance to permit the leader float to pass thereunder. The supply float itself may be movably connected to a central master float as by a swivelly mounted pipe or the like, to permit even greater freedom of movement of the nomadic leader float and thereby to insure cleaning of all portions of the pool bottom and walls.

Accordingly, it is a principal object of the present invention to provide a novel cleaner construction for swimming pools and the like. Other objects are to provide, in such a construction, novel and inexpensive means for leading hoses through water to permit random sinuous hose movement to discharge water against the pool walls and bottom; to provide means, in one form of the invention, for leading the upper ends of such hoses along a predetermined path, and in another form to permit completely random or nomadic movement of such upper ends; and for other objects and purposes as will be understood from the following description of exemplary forms of the invention taken in connection with the accompanying drawings in which:

FIG. 1 is a plan view of a swimming pool having one form of the present invention mounted for operation therein.

FIG. 2 is a fragmentary perspective view, on an enlarged scale, of the leader float of the construction of FIG. 1.

FIG. 3 is a fragmentary perspective view of a limit stop means which may be used in accordance with the invention.

FIG. 4 is a side elevational view, on an enlarged scale, of the leader float.

FIGS. 5 and 6 are sectional views of the junction box in accordance with the invention, with the parts in position to move the leader float leftwardly and rightwardly respectively.

FIG. 7 is a perspective view of a pool having a cleaner mounted therein in accordance with another form of the invention.

FIG. 8 is a plan view of the leader float of FIG. 7.

FIG. 9 is a side elevational view of the leader float of FIG. 8.

FIG. 10 is a sectional view taken on line X—X of FIG. 9.

Referring now in detail to the drawings, and first to FIG. 1 thereof, a pool is indicated generally at 10, generally elliptical in shape, having a bottom 12, opposite side walls 14 and 16 and end walls 18 and 20.

Extending from one end of the pool to the other, at approximately the level of the water in the pool, is a cable 24 constituting guide means for a leader float as-

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sembly indicated generally at 26 slidable therealong. Within the assembly is a float proper 28, here shown as generally cigar-shaped in configuration and being made of a suitable buoyant material. The cable 24 extends through the center of the float 28, there being desirably provided a pair of cable-receiving guide sleeves 29 and 30 at the ends of the float.

In the leader float assembly 26, there is suspended beneath the float 28 by suitable support legs 31 and 32 a water distribution assembly indicated generally at 34. Centrally of this assembly is a junction box indicated generally at 36, from which extend longitudinally a pair of tubes 38 and 40, the outer ends of the tubes being connected to the support legs 31 and 32 previously mentioned.

Means are provided for supplying water from a suitable source through hose 42 to a downwardly extending conduit 44 extending into the junction box 36. Laterally extending relatively rigid arms 46 and 48 lead water from the vertical conduit 44 outwardly, the rigid pipes having flexible hoses 47 and 49 connected to their respective outer ends.

As best seen in FIGS. 5 and 6, junction box 36 provides a housing for the means for controllably diverting the propelling water flow in one direction or the other longitudinally of the float assembly. Slidably mounted within the longitudinal tubes 38 and 40 is a pair of oppositely directed pipes 48 and 50 terminating at their outer ends in axially directed outlet nozzles or orifices 49 and 51 respectively. The inner ends of pipes 48 and 50 are closed, desirably by a single partition member 54 extending across the inside diameter thereof. One or more ports 55, 56, afford fluid communication for the water from conduit 44 into the pipe 48 or the pipe 50 respectively, on either side of the partition 54 forming the bottom of the pipes.

Means are provided within the tubes 38 and 40 for limiting the longitudinal movement of the pipe assembly consisting of pipes 48 and 50 within such tubes. In the present embodiment of the invention such limiting means are provided by stop members in the form of inwardly extending annular lips 60 and 62 within the respective tubes 38 and 40, against either of which an outwardly extending annular shoulder 64 on the pipe assembly is abutable. In the position seen in FIG. 5, the pipe assembly is at its extreme leftward limit of movement, so that water can enter from conduit 44 through port 56 into the right side of the pipe assembly, consisting of pipe 50, and such water then exits through the orifice 51. In accordance with well known principles of reaction, the entire float assembly 26 is thus driven leftwardly as seen in FIG. 5, while FIG. 6 shows the parts at their opposite limit of movement, for rightward movement.

Means are provided for reversing the movement of float assembly 26 at desired points. In the normal situation, such points will be fairly close to each end of a pool, and in the present embodiment of the invention, such means include tripper assemblies indicated generally at 70 and 72 respectively. As best seen in FIG. 3, tripper assembly 70 includes a downwardly extending plate 73 carried by a small tube 74 slidably mounted on the cable 24. Means may be provided for fixing the location of the tripper plate, such as a set screw or the like 75. It will be understood that the tripper plate assembly 72 is similar in construction to tripper assembly 70 just described.

It will be understood that, so long as water is supplied through hose 42 to conduit 44, the leader float assembly 26 will be slowly driven throughout the length of the pool along the cable 24, reversing its direction of movement at each end. The float assembly 26 carries along with it the outwardly extending rigid arms 46 and 48, thereby permitting the hoses 47 and 49 re-

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spectively attached thereto to perform their sinuous random movement throughout the pool and dislodge dirt and other impurities from the walls and bottom of the pool during such movement.

5 An alternative form of the invention is shown in FIGS. 7 through 10. This embodiment of the invention may be used where more unrestricted movement of the leader float is desirable in order to more thoroughly traverse all portions of the pool to be cleaned. In accordance with this form of the invention, a leader float assembly indicated generally at 100 is provided with at least two pairs of oppositely directed jets disposed in angular relation, so that movement of the leader float will be in a direction determined vectorially by the several forces acting thereon. Two of such forces will be the propulsive effect of two adjacent jets operating at any one moment, working against the drag and other frictional effects of moving the cleaning hose assembly through the water during the cleaning cycle.

20 Thus in FIG. 8, there are shown two pairs of jet propulsive assemblies, with their axes disposed at 90° to one another. Each of the two propulsive assemblies is essentially similar to the propulsive assembly heretofore described in connection with FIGS. 5 and 6, including a central junction box and tubes and pipes slidable therein and extending longitudinally from the box in opposite directions. More specifically, leader float assembly 100 is connected as through a swivel arm 102 and a flexible hose 104 having spaced floats 105 to a suitable source of water under pressure. Water supplied to the leader float assembly 100 moves downwardly through a swivel joint 106 into a junction box indicated generally at 110, which serves as a housing for the central portions of the two angularly and vertically spaced pairs of jet propulsive assemblies. These assemblies are indicated generally at 120 and 130 respectively, their central portions being in fluid communication with the incoming water below the swivel connection 106. Water passes further downwardly through T-connection 140 to flexible hoses 142 and 144, corresponding to hoses 47 and 49 heretofore described.

Water source 150 may lead through pipe 152, supported above water level by central float 154, having a swivel connection 156 for pipe 158, similarly supported above water level by a supply float 160, and connected to hose 104.

Although the two outlet orifices of each propulsive unit are illustratively shown in their preferred angular spacing of 180° with one another for simplicity and reliability of operation, nevertheless a smaller angular spacing between them might be resorted to for certain applications so long as the orifices provide reactive forces having oppositely directed vectorial components. Thus any angular spacing greater than 90° would be theoretically operative.

Modifications and changes from the illustrative forms of the invention herein shown and described are contemplated, and such modifications and changes not departing from the spirit of the invention are intended to be embraced within the scope of the appended claims.

I claim:

1. In a cleaning apparatus for swimming pools or the like, in combination:
 - a leader float assembly provided with a water inlet opening, a propulsive assembly including pipes communicating with said opening and terminating in at least two horizontally oppositely directed outlet orifices, means closing, selectively, the path of water flow to one of said orifices and actuating means for opening the path to said one orifice and closing the path to the other when the closed orifice strikes a fixed object;
 - flexible hoses having inlet ends carried by said float assembly in communication with said water inlet opening and having freely moving outlet ends;

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and a water supply conduit connected to the water inlet opening.

2. The invention as stated in claim 1 wherein said pipes constitute an elongated pipe assembly longitudinally movable between fixed limits relative to the float assembly and provided with an internal partition intermediate its ends and with openings in its walls adjacent said partition and on opposite sides thereof. 5

3. The invention as stated in claim 2 wherein said paths includes pipe assembly openings on opposite sides of the partition. 10

4. The invention as stated in claim 1 including guide means movably engageable by said leader float assembly for determining an axis of movement thereof.

5. The invention as stated in claim 1 wherein the leader float assembly includes a second propulsive assembly similar to the first named propulsive assembly and a pair of horizontally oppositely disposed outlet orifices in communication with said water inlet opening, the axis of the orifices of the second propulsive assembly being angu- 15 20

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larly spaced from the axis of the orifices of the first named propulsive assembly.

6. Swimming pool cleaning apparatus comprising: a leader float assembly provided with a water inlet opening, a propulsive assembly having two outlet orifices for discharging water in two directions angularly spaced by more than 90°, means establishing a path for water flow from said opening to said orifices and actuating means for closing the path to one orifice and opening the path to the other orifice when the leader float assembly reaches predetermined limits of travel;

flexible hoses having inlet ends carried by said float assembly in communication with said water inlet opening;

and means for supplying water under pressure to said water inlet opening.

No references cited.