United States Patent [19]

Schaeffer

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[54] **SWIMMING POOL CLEANING SYSTEM**

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[52] **U.S. Cl.** ..... **134/167 R**, 134/172, 239/450

[51] **Int. Cl.** **B08b 3/02**, B08b 9/08

[58] **Field of Search** ..... 239/450; 134/167 R, 134/168 R, 172; 4/172.15, 172.16, 172.17; 15/1.7; 210/169

[56] **References Cited**

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FOREIGN PATENTS OR APPLICATIONS

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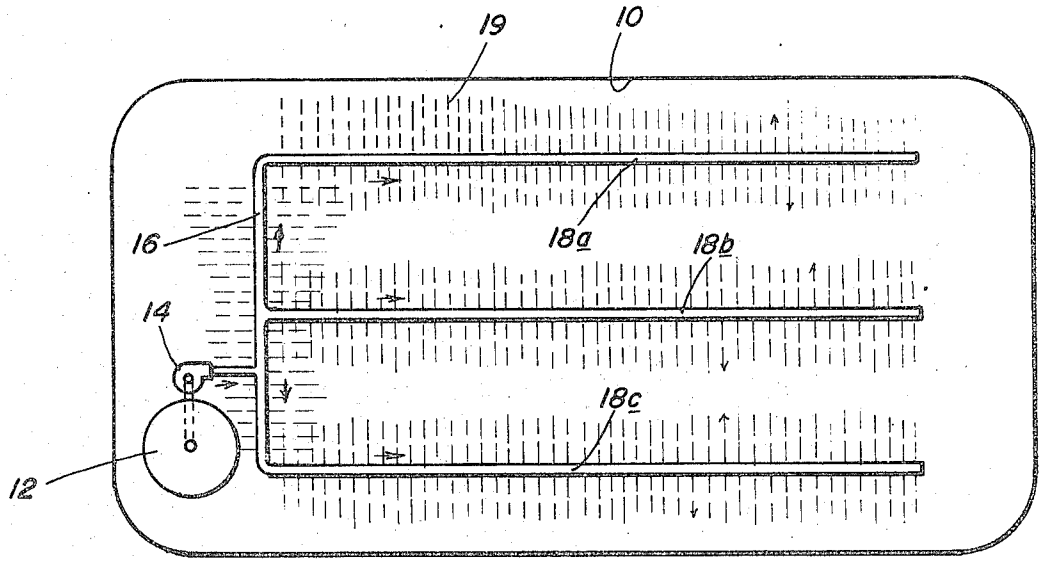
[57] **ABSTRACT**

This invention pertains to a swimming pool system wherein a plurality of flexible conductors, preferably of extruded plastic, is provided with small apertures formed in their sidewalls. These outlets provide means for forming directed jet streams of water delivered through said conductors from a pressurized supply. The jets are directed against the bottom of the pool so as to stir up dirt and debris tending to accumulate on the bottom of the pool. This swimming pool cleaning system contemplates that extruded vinyl or like flexible tubing have a flat bottom to which is applied a contact adhesive adapted to retain the tubing on the bottom of the pool whether the pool is of concrete or is made with a plastic lining. Being flexible the conductors may be arranged on the bottom of the pool in any desired order so as to agitate natural silt accumulations. The extrusions shown are more or less semicircular and may be either a single or double channel and in one embodiment is formed with an extending wing disposed to deflect the water downwardly. The jet nozzles may be only small holes or may also be short tubes.

10 Claims, 5 Drawing Figures



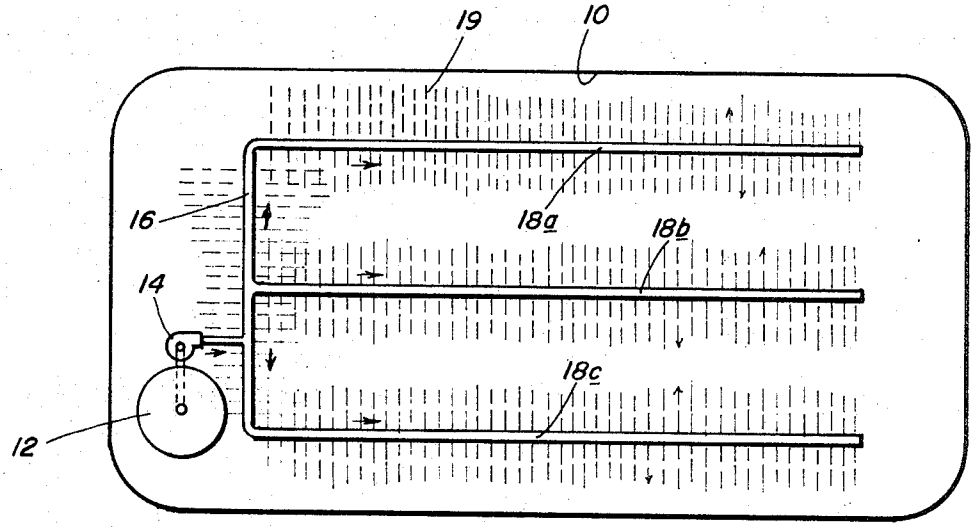


Fig-1

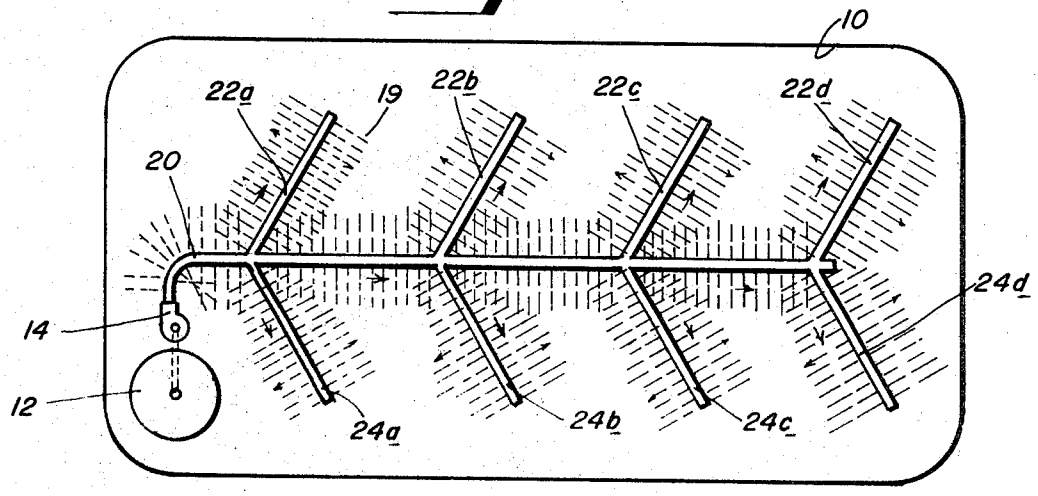


Fig-2

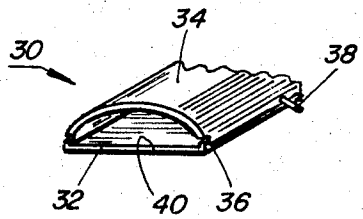


Fig-3

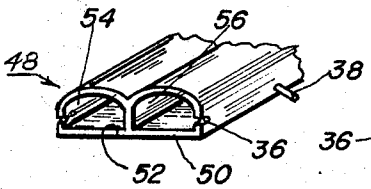


Fig-4

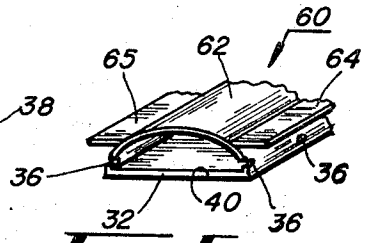


Fig-5

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SWIMMING POOL CLEANING SYSTEM

BACKGROUND OF THE INVENTION

Field of the Invention

The field of art to which this invention relates as established in the United States Patent Office pertains to the general class entitled, "Baths, Closets, Sinks and Spittoons" and to the subclass of "swimming tank or pool" and more particularly to the subclass of "system" as well as to the subclass pertaining to "with means to produce waves or current".

Another pertinent class is "Cleaning and Liquid Contact with Solids" and the subclass of apparatus with "movable means to cause fuild motion" and the subclass with "plural fluid-supplying pipes".

In addition to the above, interesting art is found in the general class of "Brushing, Scrubbing and General cleaning" and also in the general class of "Liquid Purification or Separation" in which the subclass thereunder of structural installations having "closed circulating systems" and particularly the further subclass of "aquarium or swiming pool".

Description of the Prior Art

Swiming pool cleaning devices are well known and particularly the apparatus used for silt agitation. Among the examples of such silt agitation apparatus is the apparatus in U.S. Pat. No. 2,919,027 to BLUMENFELD issued on Dec. 29th, 1959; also shown is U.S. Pat. No. 2,975,791 to PANSINI which issued on March 21st, 1961. Other more recent U.S. Pats. Include No. 3,217,886 to RUSTON as issued on Nov. 16th, 1965; No. 3,261,371 to VERNON as issued on July 19th, 1966 and No. 3,570,017 to REECE as issued on March 16th, 1971.

All of those patents and others not identified provide pressurized water fed to a series of conduits which have jet-type nozzles disposed to be moved to and over the floor of the pool to provide agitation of the received silt. In the above-identified patents and all other like apparatus known to the inventor, the conduits have been pipes or hoses which must be moved by an attendant to provide the desired sweeping action or be a permanent installation such as those built into a poured pool floor.

Where an attendant must manipulate the apparatus, the required attention is an objection. Where permanent pipe installations are provided, the fixed pipes are usually mounted on supports as a determined distance above the floor of the pool. Where the pool is shallow enough to walk in, the fixed pipes are a potential tripping means, and at deeper portions of the pool may be struck by those submerged and swimming at or near the bottom of the pool. These fixed installations are also expensive and are often less than attractive.

The present invention contemplates that the conductors will be of extruded plastic tubing and will be of selected colors which will be more of less a match with the color of the pool. The plastic tubing preferably will extend an inch or less above the surface of the pool to which it is fastened. The conductor of vinyl or like plastic is sufficiently resilient to present no hazard for swimmers or waders. Extruded plastic tubing provides an inexpensive fluid conductor and with the jet outlets preferably being only small punched holes, the installation cost and maintainence are low. The conductors are easily located and attached and for maximum efficiency may be selectively relocated as desired.

SUMMARY OF THE INVENTION

This invention may be summarized at least in part by reference to its objects.

It is an object of this invention to provide, and it does so provide, a swimming pool silt cleaning apparatus in which a plurality of plastic conductors is connected so as to feed pressurized water to the bottom of a swimming pool and through a series of small jet outlets to agitate the silt. The conductors are removably and selectively attached to the pool floor by a self-stick adhesive.

It is a still further object of this invention to provide, and it does so provide, a swimming pool silt cleaning system in which the fluid conductors are of flexible plastic extrusions of generally semicircular cross-sectional configuration, said extrusions being provided with a series of jet outlets formed in the sidewalls thereof. The flat base portions of the extrusion is provided with a self-stick adhesive by which the conductor is selectively positioned on the floor of the pool.

In the silt cleaning system to be hereinafter more fully described there is shown a plastic extruded tubing conductor which is generally semicircular in cross-sectional configuration. The outer flat bottom surface of the conductor is coated with a self-stick adhesive adapted for removable attachment to the floor of the pool. In the sidewalls of the tubing conductor are punched or formed small holes which provide outlet jets for pressurized water carried in the tubing. Three embodiments of conductors are shown. A preferred embodiment is a single conductor, an alternate is a dual conductor and yet another alternate embodiment is a single conductor in which an extending fin acts as a deflector disposed so as to direct the jet stream downwardly toward the surface or floor of the pool.

In addition to the above summary the following disclosure is detailed to insure adequacy and aid in understanding of the invention. This disclosure, however, is not intended to prejudice that purpose of a patent which is to cover each new inventive concept therein no matter how it may later be disguised by variations in form or additions of further improvements. For this reason there has been chosen a specific embodiment of a plastic extruded tubing arranged as a fluid conductor and two alternate configurations of tubing as adopted for use in a swimming pool cleaning system and in addition is shown two arrangements of cleaning apparatus disposed on the pool floor. This specific embodiment and alternate embodiments thereof have been chosen for the purpose of illustration and description as shown in the accompanying drawing wherein:

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 represents a plan view of a swimming pool cleaning apparatus wherein fluid is fed from a pump to a header member which delivers pressurized fluid to three longitudinal conductors having jet outlets;

FIG. 2 represents a plan view of yet another arrangement of a swimming pool cleaning apparatus in which a central trunk member is fed fluid from a pump, from this trunk branch conductors extend in a tree-like pattern over the bottom of the swimming pool;

FIG. 3 represents, in an enlarged scale, a partly fragmentary isometric view showing one configuration of

an extruded plastic fluid conductor in which the single passage is provided;

FIG. 4 represents an isometric view, partly fragmentary, and showing a fluid conductor similar to that of FIG. 3 but with two separate conductors provided, and

FIG. 5 represents a fragmentary isometric view of a conductor like that of FIG. 3, this conductor also having a single passageway and with a pair of wings or fins formed in the sidewall of the extrusion to extend outwardly therefrom and provide a downwardly deflecting guide for the fluid forced from the jet outlets so that the jet streams are directed parallel to or toward the bottom of the pool.

In the following description and in the claims various details will be identified by specific names for convenience; these names, however, are intended to be generic in their application. Corresponding reference characters refer to like members throughout the several figures of the drawing.

The drawing accompanying, and forming part of, this specification discloses certain details of constructions for the purpose of explanation of the broader aspects of the invention, but it should be understood that structural details may be modified in various respects without departure from the concept and principles of the invention and that the invention may be incorporated in other structural forms than shown.

Cleaning System Plan of FIG. 1

Referring now to the plan arrangement as shown in FIG. 1 it is to be noted that there is shown a swimming pool **10** substantially rectangular in configuration. At the left end of the pool a filter **12** is indicated which receives the water from the top of the swimming pool and after filtering the water is drawn to and through pump **14.** From this pump the filtered water, as indicated by an arrow, flows to a header member **16** which is connected to like longitudinal branches or conductors **18***a*, **18***b* and **18***c*. The header and branches are fluid conductors such as those shown in FIGS. **3, 4** or **5.** From both header member **16** and the longitudinal members **18***a*, *b* and *c* jets of water, indicated as by phantom lines **19,** are directed outwardly and downwardly against the bottom of the pool **10** in a manner to be hereinafter more fully described.

Cleaning System Plan of FIG. 2

Referring next to the swimming pool **10** of FIG. **2** it is to be noted that like the pool of FIG. **1** there is provided a filter **12** and a pump **14** arranged in the manner above-described. From the pump **14** the filtered water under pressure flows, as indicated by the arrow, into a conductor **20** which acts as a trunk carrier. This trunk conductor extends along the center of the pool from nearly one end to the right end. From this conductor there are connected branches **22***a*, **22***b*, **22***c*, **22***d* and branches **24***a*, **24***b* **24***c* and **24***d* which extend toward the side of the pool. These branches are connected to the center conductor **20** so that the pressurized fluid from the trunk conduit may be discharged through the many apartures formed in each branch conductor to cause jets **19** of water to be discharged outwardly and downwardly against the bottom of the pool.

Description of the Conductor of FIG. 3

Referring next to FIG. **3** there is depicted a fluid conductor **30** which is preferably made of extruded plastic such as vinyl or the like. This conductor, as extruded, is formed with a bottom member portion **32** which is substantially flat. Attached to and extending upwardly from he bottom portion is an arcuate upper portion **34.** Near the junction of the bottom member **32** and the upper portion **34** there is provided in the sidewall of portion **34** a series of holes **36.** These may be simple small holes of a few thousandths of an inch in diameter with the holes directed downwardly toward the plane of bottom **32.** To insure that the jet of fluid discharged from the interior of this conductor is directed downwardly toward the plane of bottom **32** small pieces of tubing **38** may be inserted in holes **36** so as to act as nozzles for guiding the discharge fluid in a downward manner. The undersurface or bottom face **40** of this conductor has applied thereto a substantial coating of self-stick adhesive which is so constituted as to retain its stickiness during the mounting of the conductor to the bottom of the swimming pool whether water is in the swimming pool or not. The self-stick adhesive is also adapted to retain the conductor in an attached condition at the bottom of the pool whether the pool has a plastic liner or is of smooth cement consturction.

Description of the Conductor of FIG. 4

Referring next to FIG. **4** it is to be noted that a conductor **48** which preferably is an extrusion of plastic such as vinyl, instead of being a single conduit is instead made with dual fluid passageways. Conductor **48** is formed with a bottom **50** which is generally flat and has its undersurface **52** coated with a self-stick adhesive like conductor **40** in FIG. **3.** From this bottom **50** there extends upwardly two conducting sections **54** and **56** which preferably are of like size. In the outwardly facing sidewall portions of these conducting sections and near the bottom **50** are formed apertures **36.** If desired, and as shown in FIG. **3** there may be placed in these apertures small tube extensions **38** which provide fluid guide means.

Description of the Conductor of FIG. 5

Referring finally to the conductor of FIG. **5** it is to be noted that as in FIG. **3** a conductor **60** is formed with a flat bottom **32** whose undersurface **40** also is coated with self-stick adhesive. The upper portion of the conductor as it extends upwardly from the bottom **32** is formed as an arcuate cover portion **62** similar to the portion **34** of FIG. **3.** At a determined distance above the bottom **32** and extending outwardly so that their undersurface is parallel to or is angled slightly downwardly are wings **64** and **65** which are adapted to deflect the streams of water jetting from the series of apertures **36** formed in the sidewalls of the cover portion **62.** The jets of fluid as they are expelled from the apertures are prevented by an above adjacent wing from dissipating itself upwardly.

Use and Operation of the Pool Cleaning System

As seen in FIGS. **1** and **2** fluid for the conductors **16,** **18***a*, *b* and *c* and conductors **20, 22***a*, *b*, *c*, *d* and **24***a*, *b*, *c* and *d* is supplied as pressurized water that has been first drawn through filter **12** by pump **14.** As the contours and floor size of each pool are usually different and the condition causing silt to accumulate on the bottom of the pool is unique to each individual pool it has been found desirable that pool cleaning systems have the conductors arranged so that the accumulation of

silt in certain localized areas be disposed by means of jet streams of water. Whether the installed system utilizes the conductor of FIGS. 3, 4 or 5, it is desirable that the conductor be flexible so as to be attached to the pool bottom at the desired position so that the jet streams 19 as they are forced from the various conductors are directed to the areas in which the silt tends to accumulate.

The silt accumulation problem may take several days to determine, hence it is desirable that the bottom surface 40 of FIG. 3, surface 52 of FIG. 4 or surface 40 of FIG. 5 be conditioned prior to its installation with a self-stick adhesive. The self-stick ahesive permit selective installation on the bottom of the pool and when and if changes in location are necessary or desired the position of the conductors and the jet streams may be readily relocated as desired. In use, as the pump 14 operates to draw the water of the swimming pool through the filter 12, the discharge from the pump is fed to and through the various branch lines so that the pressurized fluid jet stream is directed from the aperture against the bottom of the swimming pool. As the filter and pump are usually constantly in operation the jets agitate the slit so as to keep it in suspension and drive it toward the top of the pool where it is drawn into the filter for removal from the pool water.

As reduced to practice, the conductors shown in FIGS. 3, 4 and 5 may be only about one-half inch high and up to an inch and a half wide. The holes 36 providing the jet outlets are a very small size such as five- to ten-thousandths of an inch in diameter so that the jet streams of fluid are very small and yet are sufficient to keep the water adjacent the bottom of the pool sufficiently stirred or agitated to prevent silt from settling on the bottom of the pool.

The self-stick adhesive contemplated for use with the conductors above-shown and described is contempalted as being unaffected by water particularly when treated with a small amount of chlorine additive. As it is often desirable to relocate the conductors the adhesive must be retained on the plastic extrusion while it must release from the pool surface or liner without leaving a residue. Depending on the plastic used for the conductors, such adhesives are commercially available or may be formulated as desired.

The showings of FIGS. 1 and 2 show no joints in the extents of conductors. Such showings are not deemed necessary as it is contemplated that thin wall plastic extruded tubing will be provided. This tubing will be cut into a short length and inserted into the two conductor pieces to be joined. A slight interference fit is contemplated and adhesive may be used to insure a seal. The ends of the conductors will have closing plugs. The number of conductors and arrangement will be determined through evaluation of several factors; i.e., size and depth of pool; amount of silt or dirt; capacity of pump and of course expanse. Combinations of the conductors as above-shown and-described are of course contemplated. It is also contemplated that, if desired, the conductors may be arranged as closed loops. For example in FIG. 1 the right end of conductor 18*a* could be connected to the right end of 18*c* by a like or different conductor. Such a closed loop would provide an additional cleaning path. The number and proximity of the conductors are a matter of selection which is determined by the size and silting conditions particular to the pool in which the system is installed.

Once installed the cleaning system is contemplated to operate with little or no maintenance. the conductors, being attached by adhesive to the floor of the pool extend only a slight amount above the pool floor. This height is preferably an inch or less and being of plastic permits walking thereon with little or no discomfort.

Terms such as "left", "right", "up", "down", "bottom", "top", "front", "back", "in", "out" and the like are applicable to the embodiments shown and described in conjunction with the drawing. These terms are merely for the purpose of description and do not necessarily apply to the position in which the swimming pool cleaning system may be constructed or used.

While a particular embodiment of a fluid conductor and alternate embodiments thereof have been shown and described it is to be understood the invention is not limited thereto since modifications may be made within the scope of the accompanying claims and protection is sought to the broadest extent the prior art allows.

What is claimed is:

1. In a swimming pool cleaning system wherein the silt is agitated by jet streams of pressurized water directed against the wall and the floor of the pool, said cleaning system including: (a) a header member adapted to receive a supply of pressurized water and to transport said pressurized water; (b) at least two fluid conductors connected to the header member so as to receive a determined portion of the pressurized water and to conduit said water therethrough, said conductors being made of a flexible plastic and being formed so as to have a substantially flat bottom portion and with a cover member extending from the bottom portion to provide a passageway through along the conductor; (c) a self-stick adhesive applied to the outer face surface of the flat bottom portion, the adhesive adapted to retain the conductor to and on the inner surface of the pool when the flat surface of the conductor is pressed thereagainst, and (d) a multiplicity of small apertures formed in the cover member, said apertures disposed and extending through the wall of the cover member so that pressurized water as it is discharged from the aperture will act as a jet stream and its orientation is such that it will tend to flow toward the plane of the flat surface of the bottom portion of the conductor when the conductor is in attached condition on the surface of the pool.

2. A swimming pool cleaning system as a claim 1 in which the fluid conductors are of extruded plastic such as vinyl.

3. A swimming pool cleaning system as claim 2 in which the conductor is formed to provide a single passageway and the cover member is formed as an integral arcuate member.

4. A swimming pool cleaning system as in claim 3 in which the cover member is formed with at least one wing member which extends outwardly from the side portion of the cover member, said wing member disposed to act as a downward deflector for a jet stream of water exiting from the aperture formed in the cover member, said aperture disposed in the sidewall portion of the cover member intermediate the wing and the flat bottom.

5. A swimming pool cleaning system as in claim 2 in which the conductor is formed to provide two separate fluid passageways and in which there are apertures formed in the oppositely disposed sidewalls of the

cover member so that jet streams are discharged from opposite sides of the cover member.

6. A swimming pool cleaning system as in claim **2** in which the overall height of the plastic extrusion is not more than an inch.

7. A swimming pool cleaning system as in claim **1** in which the diameter of the apertures providing the jet stream is less than ten-thousandths of an inch.

8. A swimming pool cleaning system as in claim **1** in which at least some of the aperatures in the cover member have short lengths of small tubing connected thereto so as to provide directed flow of the jet streams of pressurized water.

9. A swimming pool cleaning system as in claim **1** in which the header member has at least three like length conductors attached thereto, each conductor having a spaced series of apertures along each side of its cover member.

10. The words-In a swimming pool cleaning system wherein the silt is agitated by jet streams of pressurized water directed against the wall and the floor of the pool, said cleaning system including: a fluid conductor made as an extruded tube of flexible plastic such as vinyl, the extrusion being shaped so as to provide a substantially flat bottom portion from which a cover member extends to provide a tubular passageway through and along the conductor; a self-stick adhesive applied to the outer face surface of the flat bottom portion, said self-stick adhesive adapted to retain the conductor to and on an inner surface of a pool when the flat surface of the conductor is pressed thereagainst, and a series of small apertures formed in the cover member, the aperture being shaped and oriented in the sidewall of the cover member so that pressurized water as it is discharged from the aperture will tend to flow in a path adjacent to the plane of the flat surface of the attached bottom portion of the conductor.

* * * * *