

May 25, 1971

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3,579,657

SWIMMING POOL COVER DRAIN

Filed Sept. 4, 1969

3 Sheets-Sheet 1

FIG. 1.

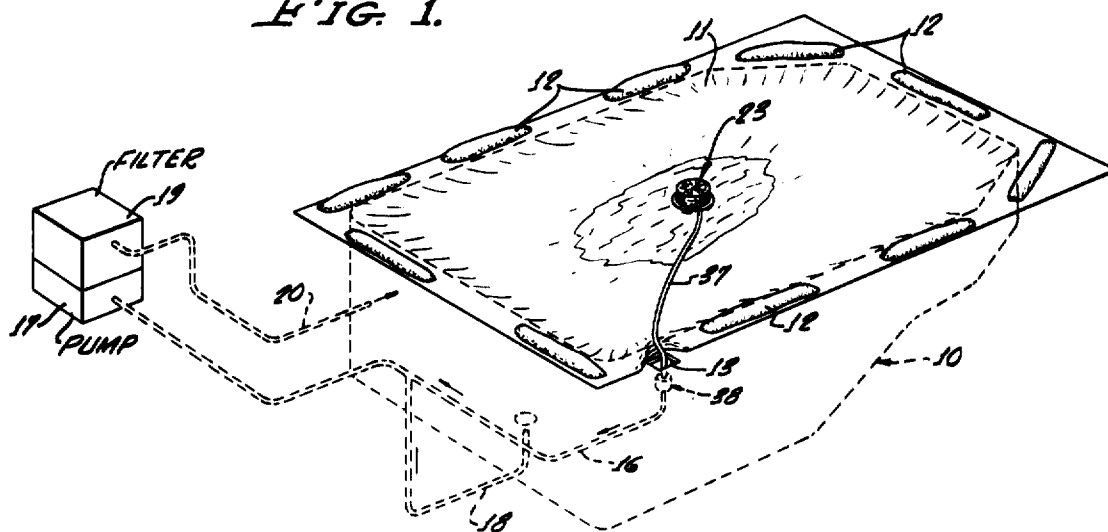
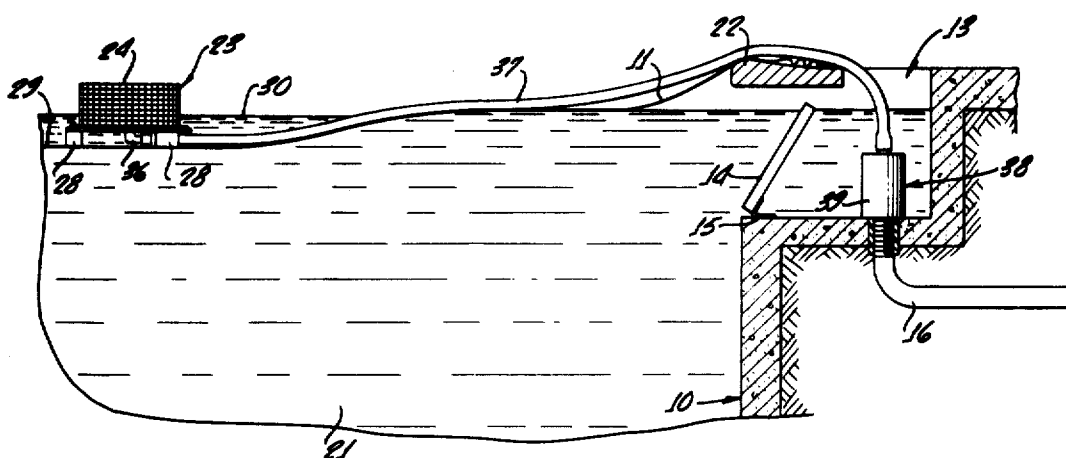


FIG. 2.

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3 Sheets-Sheet 2

FIG. 3.

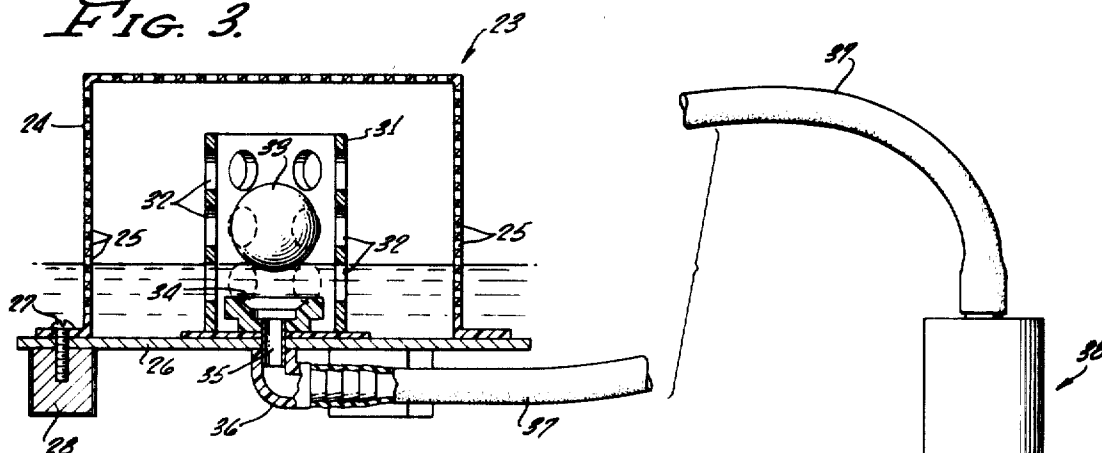
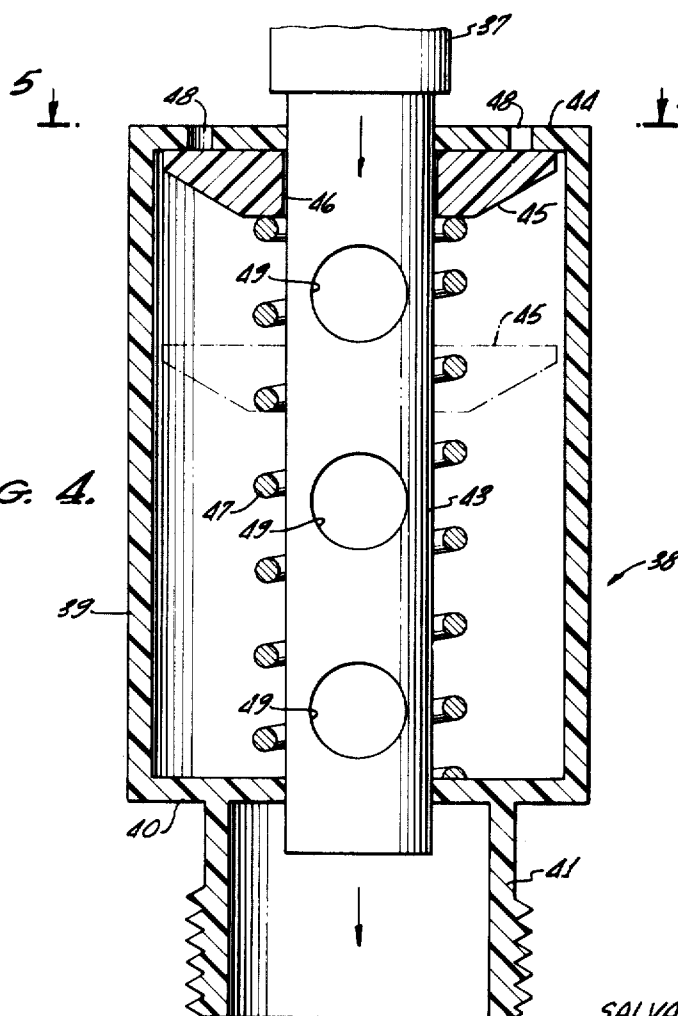


FIG. 4.



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3 Sheets-Sheet 3

FIG. 6.

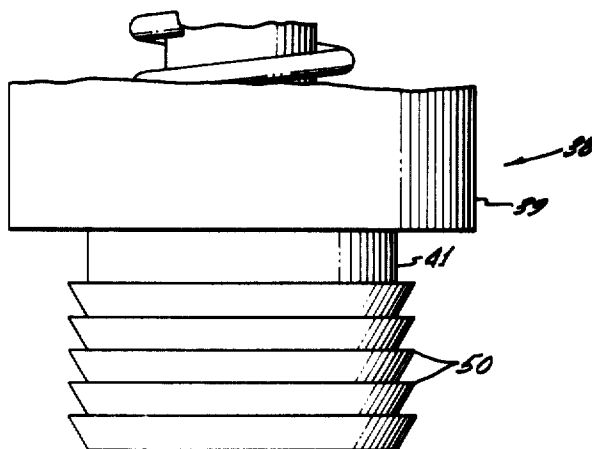
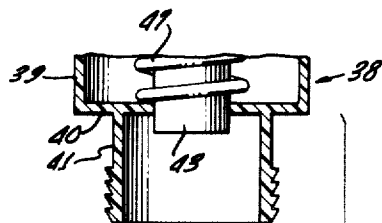
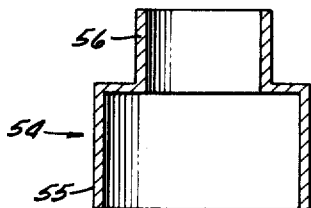
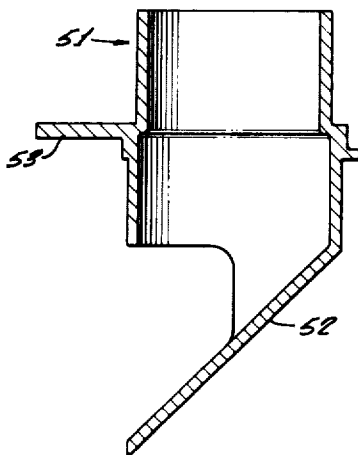


FIG. 7.

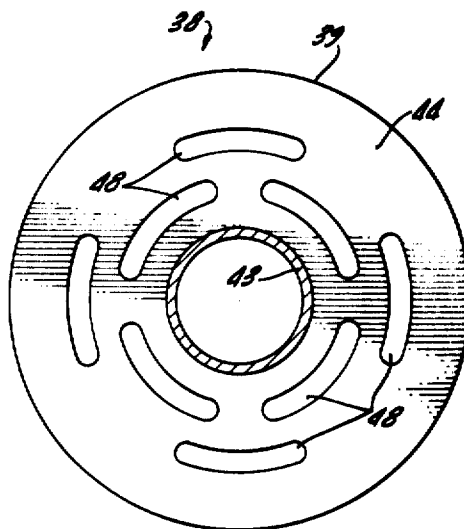


FIG. 5.

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1

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SWIMMING POOL COVER DRAIN

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14 Claims

ABSTRACT OF THE DISCLOSURE

A device for pumping water from a swimming pool cover including a first unit located on a swimming pool cover, the first unit having a float valve opened by water accumulating on the cover, the valve connecting to a second unit at the pool skimmer so that water from the cover is conducted to the inlet of the pump for the pool's circulation system. A valve member in the second unit is spring-biased to a closed position, but opened in response to suction upon the closing of the float valve, thereby providing normal system operation through the pool skimmer when no water is present on top of the cover.

BACKGROUND OF THE INVENTION

Field of the invention

This invention relates to a device for draining swimming pool covers.

The prior art

Commonly, a swimming pool owner will cover his pool during the winter months or at other times when the pool is out of use. This almost eliminates pool maintenance and greatly limits the consumption of chemicals, with attendant cost reduction to the pool owner. A typical pool cover is a flexible sheet of plastic material overlying the pool and held along the perimeter of the pool by sand bags or other weights. Necessarily, therefore, the cover inclines downwardly from the coping of the pool to the central pool area, where the cover rests on the water in the pool beneath it. As a result, rain water accumulates on top of the cover. Dirt and debris also collect on the cover along with the rain water.

There has been no satisfactory way of removing the water from the top of the cover, so that except for the amount that evaporates it remains on the cover until the cover is taken off. An effort to dip the accumulated water off in a bucket is very slow and laborious, and it is not possible to remove all of the water from the top of the cover because much of it will be beyond reach from the pool edge. The extra weight of the water remaining on top of the cover makes removal of the cover difficult, and frequently dirty water and debris will be dumped into the pool inadvertently at the time the cover is removed. Another serious problem from the stagnant water on the cover is that it becomes a breeding place for insects. Generally, it is not practical to treat the water on the cover to kill the insect larvae, particularly in view of the fact that water from the top of the cover in many instances ultimately becomes mixed into the water within the pool so that chemicals in the stagnant water are undesirable.

SUMMARY OF THE INVENTION

The present invention provides a means whereby water automatically is pumped from the top of the cover into the filter of the pool's normal circulation system. There, the water from the cover becomes cleaned and then is returned to the pool to mix with the other water beneath the cover. When the cover has been pumped dry, a valve automatically closes the intake on top of the cover, while

2

a second valve opens at the skimmer to allow the pool water to circulate in the normal manner.

These results are accomplished by an assembly that includes a unit positioned at the center portion of the cover. This unit is of sufficient mass to cause a depression to be formed in the cover, so that the water accumulating on the cover will run into the depression and surround the unit. Within this unit is a ball valve, which is floated off its seat when there is water present around it, but returns to its seat when the cover is pumped dry. A conduit extends from the unit on the cover to a second unit positioned in the skimmer of the pool's circulation system. The latter element includes a tube that connects to the entrance to the pump's suction line at the skimmer, conducting the water from the top of the pool cover to the pump inlet. This tube is within a chamber having openings in its upper end wall. A piston is slidably received on the tube and biased normally upwardly to close off the openings in the upper wall of the chamber. However, when the float drops onto the valve seat on the cover unit, thereby closing off the conduit, a suction is created within the valve chamber that draws the piston downwardly uncovering the apertures through the upper wall of the chamber. This provides communication through the skimmer to the pump inlet line, thereby permitting the water to circulate in the normal manner. Thus, the system automatically changes from pumping from the top of the cover to the normal operation through the skimmer. Later, when more rain water accumulates on the cover, the float valve will rise and the spring will cause the piston to close off the valve openings within the skimmer, so that water again is pumped from the top of the cover.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a perspective view of the device of this invention in association with a swimming pool and its circulation system;

FIG. 2 is a transverse sectional view through the pool, showing the overall arrangement of the device;

FIG. 3 is an enlarged fragmentary sectional view through the two valve units of the device;

FIG. 4 is an enlarged longitudinal sectional view of the valve unit within the pool skimmer;

FIG. 5 is a top plan view of the skimmer valve unit;

FIG. 6 is an enlarged fragmentary view of the bottom portion of the skimmer valve unit, illustrating an alternate arrangement for connection to the entrance of the pump's suction line; and

FIG. 7 is an exploded longitudinal sectional view of an arrangement for connecting the skimmer valve unit to an existing valve at the skimmer.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The swimming pool cover drain of this invention is illustrated in association with a swimming pool 10 of conventional construction, over the top of which is a cover 11 suitably held in place by weights 12 at its periphery, or by other means. Typically, the cover 11 is made of a relatively thin, flexible plastic material.

The swimming pool 10 has a water-circulation system that includes a skimmer 13 at the edge of the pool. Access to the skimmer is provided by a baffle or gate 14 at the edge of the pool, pivoted about its lower edge 15. A line 16 connects to the bottom of the skimmer 13 and extends to the suction side of a pump 17. An additional line 18 from the drain at the bottom of the deep portion of the pool 10 connects to the line leading to the pump 17. The outlet of the pump 17 connects to a filter 19, which connects through a return line 20 to the upper portion of

the pool 10. This system, therefore, is capable of circulating the water 21 from within the pool 10 to the filter 19 and back to the pool. The water 21 is returned beneath the cover 11, which inclines downwardly from the coping 22 at the pool edge to rest on the surface of the water 21.

The pool cover drain device includes an inlet unit 23 which is positioned generally at the center of the pool cover 11. The unit 23 includes a cup-shaped housing 24, which may be made of plastic material and which includes a plurality of perforations 25 through its top and side walls. The housing 24 is secured to a flat bottom wall 26 by means of screws 27, so that it is removable to provide access to the interior of the unit 23. Weights 28 are attached to the bottom wall 26 so that the unit 23 is of appreciable weight. This causes it to form a depression 29 at the area of the swimming pool cover 11 where it rests (see FIG. 2). Consequently, any water 30 that accumulates on the swimming pool cover will run into the depression formed by the unit 23, and thus surround the unit 23. The weights 28 are secured to the undersurface of the wall 26 by means of the screws 27 that extend through the edge of the bottom wall 26 into tapped openings in the weights. Preferably, the weights 28 are plastic-coated so that they will not stain the cover 11.

Within the intake unit 23 at its center and projecting vertically above the bottom wall 26 is a cage 31 having a cylindrical side wall provided with openings 32. Within the cage 31 is a ball 33 and an annular seat 34 for the ball leading to an outlet passageway 35 provided by an elbow 36. The ball 33 is adapted to float in the water 30 that has collected on the top of the cover 11 and which is free to enter the housing 24 through the perforations 25. When the ball 33 floats in the water 30, it is raised above the valve seat 34 so that communication is provided with the passageway 35. Conversely, in the absence of the water 30, the ball 33 will drop onto the seat 34 and close the passageway 35. The perforations 25 provide relatively small openings into the housing 24 so that foreign matter is screened out and will not reach the valve seat 34 to interfere with proper seating of the ball 33. The cage 31 guides the ball 33 in a vertical path so that it will be able to seat as the water level drops.

A flexible tube 37 connects to the fitting 36 and extends across the top of the cover 11 to the side of the pool, where it enters the skimmer 13 and connects to a valve unit 38. The latter unit includes a cylindrical housing 39 from the bottom wall 40 of which is a tubular projection 41 that is extended into the opening 42 in the skimmer at the entrance to the return line 16 of the water-circulation system. In the embodiment shown in FIGS. 1-5, the entrance to the line 16 is provided with threads, normally for receiving a plug during the time that the pool is being vacuumed. Therefore, the tubular section 41 is provided with external threads for engaging the threads in the opening 42, holding the valve unit 38 at the bottom of the skimmer 13 beneath the surface of the water 21 in the pool 10.

Running axially through the center of the chamber 39 is a tube 43. One end of the tube 43 projects upwardly past the upper wall 44 of the chamber 39, where it connects to the end of the line 37. The opposite end of the tube 43 extends downwardly through the bottom wall 40 of the chamber 39 and into the tubular section 41. This provides communication, when the ball 33 is in the raised condition, from the interior of the intake unit 23, through the flexible line 37 and the tube 43, to the line 16 that returns the water to the pump 17 and the filter 19.

Circumscribing the tube 43 within the chamber 39 is a free piston 45. This member has a central opening 46 that receives the tube 43, and the piston is slidable relative to the tube 43, which guides it and maintains it aligned transversely relative to the chamber 39. The diameter of the piston 45 is a little less than that of the cylindrical wall of the housing 39. A compression spring 47 circumscribes

the tube 43 beneath the piston 45, one end of the spring bearing against the undersurface of the piston and the other end of the spring engaging the bottom wall 40 of the chamber 39. The spring 47 may be plastic- or rubber-coated to prevent corrosion. This spring biases the piston 45 to a normal upward position in which it engages the upper wall 44 of the chamber 39. In that location, the piston 45 acts as a valve member that closes apertures 48 in the wall 44. There is communication beneath the piston 45 between the chamber 39 and the interior of the tube 43 through openings 49 in the wall of the tube.

With the components arranged as described above, the pump 17 of the circulation system is operated in its normal manner. With the water 30 being present on top of the cover 11, and surrounding the unit 23 by virtue of the depression 29 in the cover formed by the weight of the unit 23, the ball 33 will be elevated from the seat 34, as described above. At the same time, the piston 45 closes off the openings 48 in the chamber 39. Therefore, the pump 17 then will draw the water 30 through the line 37 and the tube 43 into the return line 16. This water circulates through the pump into the filter 19, where foreign matter is removed, after which it is pumped through the line 20 to the pool 10 beneath the cover 11. Ultimately, this will remove substantially all the water 30 from the top of the pool cover 11. When that occurs, the ball 33 will drop downwardly, engaging the seat 34 and closing the access from the unit 23 to the tube 37. This prevents the pump 17 from drawing air.

When the float valve closes, the suction of the pump 17, by reason of the openings 49 in the wall of the tube 43, reduces the pressure in the chamber 39 beneath the piston 45. This causes the piston 45 to be moved downwardly against the opposing force of the spring 47 by the greater fluid pressure above the piston. As soon as this occurs, the openings 48 in the upper wall 44 of the unit 38 no longer are obstructed by the piston 45. Consequently, the water within the skimmer 13 around the valve unit 38 enters the chamber 39 through the openings 48, flowing around the perimeter of the piston 45 and into the apertures 49 through the tube 43. From there, the water is conducted through the return line 16 to the pump and filter.

Thus, as soon as the water 30 is exhausted from the top of the pool cover, the ball valve at the unit 23 automatically closes, so that air will not be drawn through the pump's suction line. At the same time, the valve unit 38 within the skimmer 13, operating by the pump's suction, opens up to allow the water from within the skimmer to be pumped in the conventional manner. This continues until such time as water again accumulates on top of the cover. In that event, the ball 33 will be caused to rise off the valve seat 34, thereby opening communication through the line 37 to the line 16. At that time, the spring 47 will cause the piston 45 to be returned to its upper position, closing off the apertures 48, while all pumping will be through the line 37 until the water 30 on top of the cover is exhausted. Thus, the unit of this invention automatically shifts back and forth to exhaust the water from the top of the pool cover whenever it accumulates, returning to the normal pool circulation system as soon as the cover has been pumped dry.

In some pools, there are no threads at the entrance 42 to the return line 16 leading to the pump 17. For such pools, the bottom tubular projection of the skimmer valve unit 38 is modified as shown in FIG. 6. In place of the exteriorly threaded tubular projection 41, the bottom tubular element of FIG. 6 is provided with a series of annular ribs 50. These ribs taper upwardly and are dimensioned to wedge into the entrance to the line 16. This forms a seal and holds the unit 38 at the bottom of the skimmer 13.

The unit of this invention is adapted for use with virtually any type of pool circulation system. In some, there is a member at the entrance to the pump inlet line at the

5

skimmer, which may be rotated to close off the main drain line 18, so that all water is taken directly from the skimmer. Such a device is shown in FIG. 7, and includes a tubular member 51 with an angular bottom end wall 52 that acts as the valve member as the unit 51 is rotated. A short handle 53 projects outwardly from the tubular portion 51 for permitting rotation of the tubular portion 51 about its axis. Connection is made to this unit by means of an adapter 54 that includes a first tubular section 55 of relatively large diameter connecting to a second tubular portion 56 of relatively small diameter. The larger portion 55 slips over the upper part of the tubular member 51 of the rotatable valve member. The smaller portion 56 slides into the bottom tubular element 41 of the valve unit 38. Thus, there is communication through the adapter 54 and the tubular member 51 into the pump's suction line 16.

I claim:

1. In combination with a swimming pool having water therein, a pump for circulating said water, an intake for said pump, and a cover over said water in said pool, a device for removing additional water collecting on said cover comprising

a first inlet means on said cover,
means connecting said first inlet means to said intake for said pump for conducting water on said cover to said pump,

a second inlet means communicating with said water in said swimming pool,
means connecting said second inlet means to said intake for said pump,

and means for opening said first inlet means and closing said second inlet means when water is on said cover, and for closing said first inlet means and opening said second inlet means in the absence of water on said cover.

2. A device as recited in claim 1 in which said first inlet means has appreciable weight, said first inlet means providing a depression in said cover for causing said additional water on said cover to flow toward said first inlet means.

3. A device as recited in claim 1 in which said means for opening and closing said first and second inlet means includes a first valve means at said first inlet means, and a second valve means at said second inlet means,

said first valve means being responsive to water collecting on said cover for opening said first inlet means when water collects on said cover, and closing said first inlet means in the absence of water on said cover,

said second valve means being responsive to the closing of said first valve means for opening said second inlet means, and to the opening of said first valve means for closing said second inlet means.

4. A device as recited in claim 3 in which said second valve means includes

a valve member,
resilient means biasing said valve member to a normally closed position,
and means for subjecting said valve member to fluid pressure for moving said valve member to an open position upon the closing of said first valve means.

5. A device as recited in claim 3 in which said first valve means includes

a valve seat at said first inlet means,
and a float valve member for engaging said valve seat and closing said first inlet means,
said float valve member being movable away from said seat by water collecting on said cover.

6. In combination with a swimming pool having water therein, a pump, a suction line connecting to said pump, said suction line having an entrance communicating with said pool and submerged beneath the surface of said

6

water, and a cover over said pool and said water therein, a device for automatically draining additional water collecting on said cover comprising

a first valve unit on said cover,

said first valve unit including a first valve means responsive to the level of water on said cover, said first valve means being opened by the accumulation of water on said cover above a predetermined depth and closed by the dropping of said water on said cover below said predetermined depth,

a second valve unit,

said second valve unit being submerged below the surface of the water in said pool,

conduit means connecting said first valve unit to said second valve unit,

means providing communication between said conduit means and said entrance,

whereby water accumulating on said cover may be drawn through said conduit means and into said suction line,

means in said second valve unit providing communication between said water in said pool and said entrance, and valve means in said second valve unit normally closing communication between said water in said pool and said entrance,

said valve means in said second valve unit being responsive to the closing of said first valve means for opening said communication between said water in said pool and said entrance.

7. A device as recited in claim 6 in which

said cover is of flexible material,

said first valve unit including means providing said first valve unit with an appreciable weight,

whereby said first valve unit provides a depression in said cover for causing water on said cover to collect around said first valve unit.

8. A device as recited in claim 6 in which said first valve unit includes

a float,

and a valve seat,

said valve seat having an opening leading to said conduit means,

said float being raised above said valve seat upon the collection of water above said predetermined level and lowered to said valve seat upon the reduction of said water on said cover below said predetermined level.

9. A device as recited in claim 8 in which

said float is a spherical member, and including a cage receiving said spherical member for guiding said spherical member in a substantially vertical path above said valve seat.

10. A device as recited in claim 9 including in addition a wall circumscribing said cage,

said wall including perforations therethrough for allowing water to have access to said float while screening out solid objects,

whereby said float can seat on said valve seat without interference from such objects.

11. A device as recited in claim 6 in which

said second valve unit includes a housing having an upper wall and a lower wall,

and means at said lower wall connecting to said entrance,

said means providing communication between said conduit means and said entrance including tubular means extending through said upper wall, said tubular means connecting to said conduit means,

said tubular means having opening means therethrough providing communication between the interior of said housing and said entrance,

said means in said second valve unit providing

7

communication between said water in said pool
and said entrance including aperture means
through said upper wall,
said valve means in said second valve unit includ-
ing a valve member having an opening slidably
receiving said tubular means, and resilient means
biasing said valve member to a normal upper
position covering said aperture means,
said valve member being movable away from
said aperture means in response to the re-
duction of pressure in said housing for
thereby providing communication through
said aperture means and said opening means
with said entrance.
12. A device as recited in claim 6 in which
said pool has a skimmer,
said entrance being in the bottom portion of said
skimmer,
said second valve unit being in said skimmer,
said second valve unit having a downwardly projecting
portion received in said entrance.
13. A device as recited in claim 12 in which

8

said entrance has screw threads therein,
said downwardly projecting portion having exterior
threads received in said threads of said entrance.
14. A device as recited in claim 12 in which
said entrance is unthreaded,
said downwardly projecting portion including annular
ribs engaging the periphery of said entrance for form-
ing a seal therewith.

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