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SURFACE SKIMMER FOR SWIMMING POOLS AND METHOD

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2 Sheets-Sheet 1

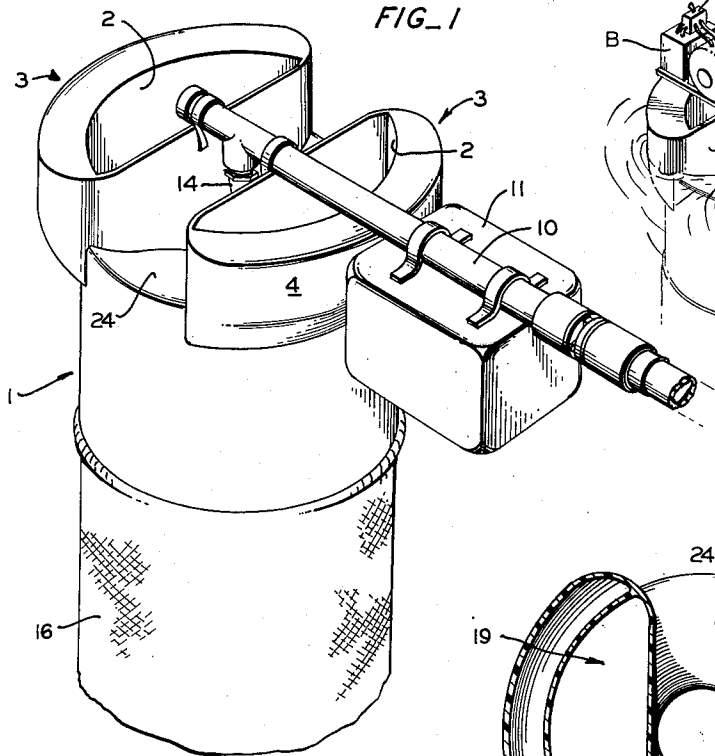


FIG. 1

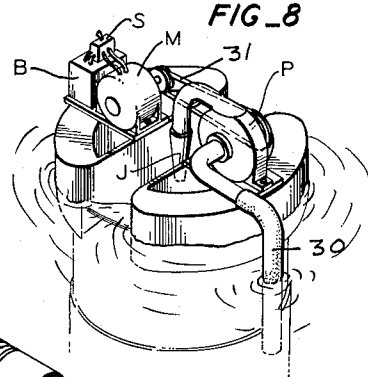


FIG. 8

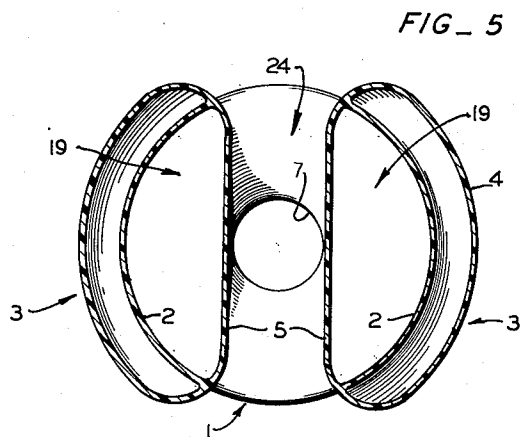


FIG. 5

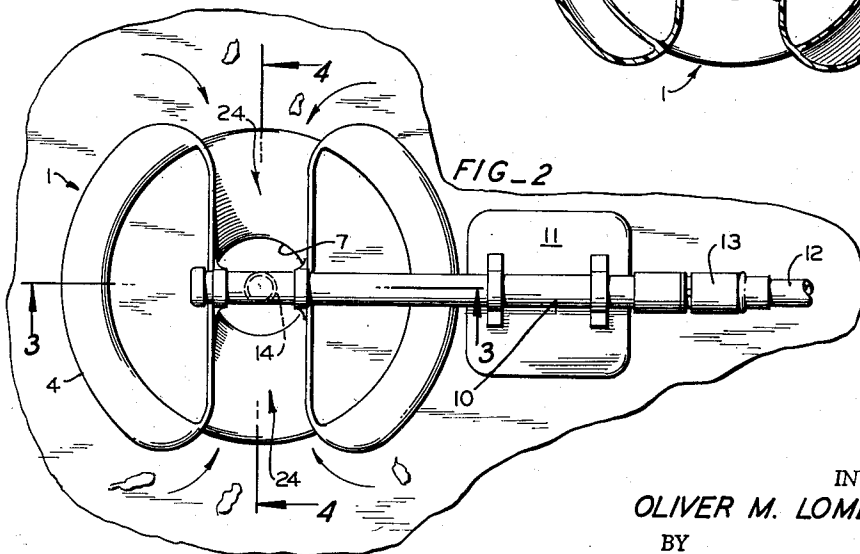


FIG. 2

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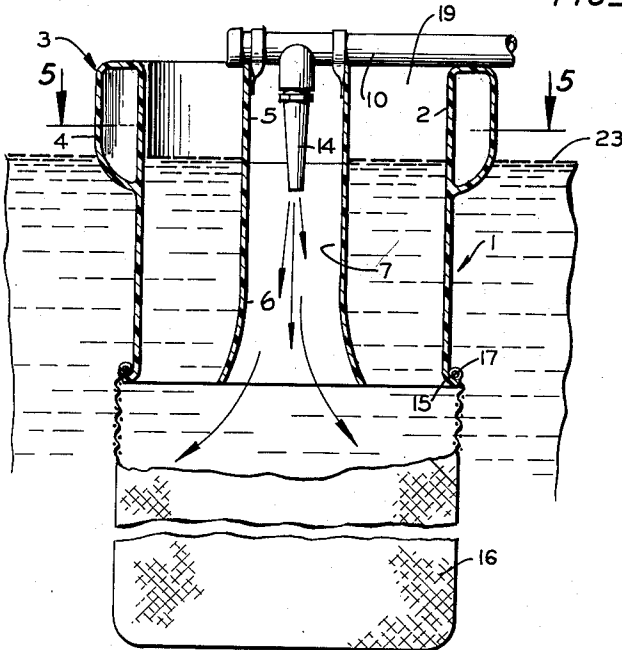
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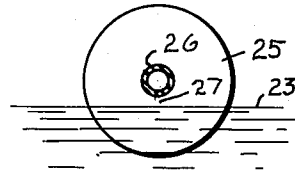
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2 Sheets-Sheet 2

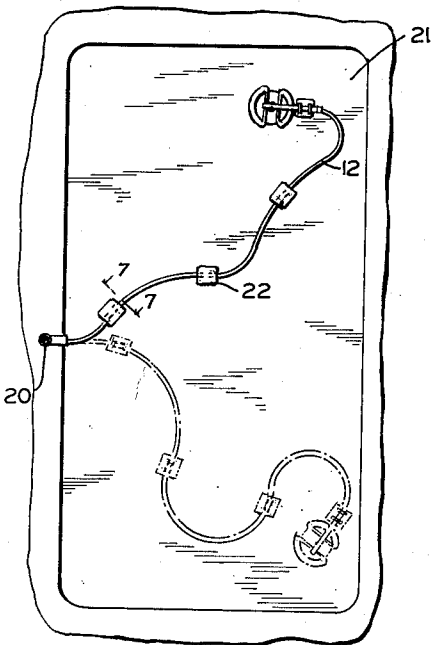
FIG_3



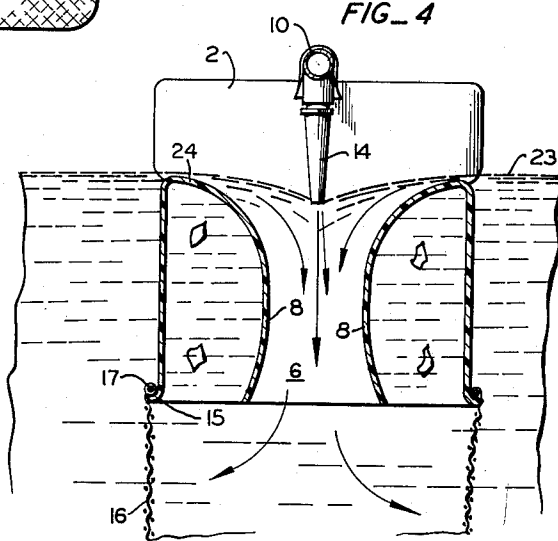
FIG_7



FIG_6



FIG_4



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SURFACE SKIMMER FOR SWIMMING POOLS AND METHOD

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 6 Claims. (Cl. 210-65)

This invention relates to a device for use in removing floating foreign material from swimming pools and other bodies of water. Heretofore devices for removing leaves, twigs, and other floating debris or foreign material from pools have been in fixed positions, with the result that a reasonably effective installation has usually required the use of a plurality of skimming devices, thus requiring quite expensive installation expense in addition to the cost of the devices, and when completed the devices still would have relatively low efficiency in reaching to certain areas of the pool, and they would also be limited for their use to certain restricted water levels.

One of the objects of the present invention is the provision of an automatic skimming device that overcomes the heretofore disadvantages and limitations above mentioned, and which device is adapted to reach any surface area of the pool where debris may be floating, and thereby perform, within seconds of time, a debris collecting operation that might require hours in the case of the fixed devices.

Another object of the invention is the provision of an automatic skimming device that is operative solely by water, under pressure in a city or household water system or in the recirculation system of a swimming pool.

Another object of the invention is the provision of an automatic skimmer that is adapted to move under the influence of atmospheric air currents to the same places in a pool as those where floating debris will be carried or moved under the influence of the same air currents, thus automatically positioning itself where the skimming operation will be most efficiency performed.

A still further object of the invention is the provision of an improved method of collecting the floating debris in a swimming pool by the steps of inducing the debris to be carried to a particular place and then moved into the water below the level of the water in the pool and refloats in a confined space from which it can readily be lifted or removed from the water in the pool.

An additional object is the provision of a skimmer adapted to be actuated by the operation of introducing fresh water into the pool, thus performing the function of replenishing the water in the pool and at the same time collecting the floating debris for removal therefrom.

Another object is the provision of a skimmer that is adapted to operate with equal efficiency irrespective of the level of the water in the pool, provided there is sufficient water to float the device, and which device will automatically follow the level of the water in the pool.

Other objects and advantages will appear in the description and in the drawings.

In the drawings,

FIG. 1 is a perspective view of the skimming device.

FIG. 2 is a reduced size top plan view of the device of FIG. 1.

FIG. 3 is a sectional view taken along line 3-3 of FIG. 2.

FIG. 4 is a sectional view taken along line 4-4 of FIG. 2.

FIG. 5 is a sectional view taken along line 5-5 of FIG. 3.

FIG. 6 is a plan view of a swimming pool with the skimming device of FIG. 1 indicated therein and connected for use.

FIG. 7 is an enlarged sectional view taken along line 7-7 of FIG. 6.

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FIG. 8 is a perspective view looking from above of a self contained skimmer including its source of power.

In detail, a generally tubular body 1 is adapted to be supported upright within the water of a pool. The cylindrical wall of this body may have a pair of oppositely positioned upright, spaced extensions 2 (FIG 3) in upward continuation of said cylindrical walls, which extensions form the inner adjacent walls of a pair of hollow float members, or buoyant members, generally designated 3. The outer walls 4 of said hollow float members are connected at their edges with the edges of the extensions 2 by relatively narrow top, bottom and end walls, and each of the said walls 4 is preferably curved horizontally to be concentric with the curvature of the extension 2 that is adjacent thereto (FIG. 5).

Flat, vertical, horizontally spaced, opposed walls 5 respectively extend between the opposite lateral ends of the curved walls 2 and across the upper end of the body 1. These walls 5 have selections 6 (FIGS. 3, 4) that extend downwardly into the tubular body 1 to points substantially even with the lower circular edges of the latter. Said extensions 5 coact with each other to form two of the opposite sides of a vertically extending central passageway 7. The other two sides 8 of said passageway are curved as seen in FIG. 4 to form channels 24 and to meet the upper edges of the tubular member 1 at points near or approximately at the lower sides of the float members 3 and they define a restricted throat at a point intermediate the upper and lower ends of said sides. Thus the passageway 7 is generally of venturi shape in one dimension.

A conduit 10 in the form of a pipe extends over the space between the float members at one end, while the other end projects laterally from one of said float members and is secured to a float 11. The end of the pipe or conduit 10 that is adjacent to float 11 may be provided with a conventional vacuum breaker 13, which vacuum breaker, in turn, is adapted to connect with an ordinary hose coupling member on one end of a flexible hose 12.

The portion of the conduit that extends to a position over passageway 7 has a downwardly projecting jet nozzle 14 threadedly connected thereto, which nozzle is coaxial with said passageway 17, and its lower discharge end preferably projects slightly into the upper end of said passageway and below the level of the water in the pool when the skimmer is floated in such pool.

The tubular member 1 virtually forms a skirt depending downwardly from the adjacent sides of the pair of float members 3. The lower edge of said skirt may be formed with a circular bead or ridge 15 over which the upper marginal portion of a mesh bag 16 may extend. An elastic cord or drawstring 17 may releasably secure the mouth of the bag around the skirt above the bead 15.

The mesh openings in bag 16 are sufficiently large to permit the water to flow therethrough but twigs, leaves and other floatable solids will be caught. Bag 16 is preferably floatable itself, so as not to add weight to the device.

As best seen in FIG. 3 the portion between the walls 5, 2 at the inner side of each float member 3 is open at the lower and upper ends, and these will form an upwardly opening compartment 19 at the inner side of each of said float members.

In operation, the flexible hose 12 may be connected at one end to a faucet 20 at one side of the pool 21 (FIG. 5). Floats 22 on said hose will support it above or at the surface of the water, and the other end of the hose is secured to the hose coupling in conduit 10.

When body 1 is placed in the water, it will be substantially vertical and will support the skimmer device so that the upper end of passageway 7 and the discharge end of nozzle 14 are below the water level 23 (FIG. 4). The float 11 that is connected with the conduit 10 will

prevent objectionable tipping of the skimmer due to its connection with the hose 12.

As seen in FIG. 5 the skimmer can be moved quickly to any point on the surface of the water, and it will automatically be carried to the leeward wall of the pool where the debris will also be carried. Thus it will automatically float to the place where the debris will be moved by the wind, and will therefore be in a position to function most efficiently.

A relatively low water pressure in the hose 12 will satisfactorily actuate the ejector arrangement that comprises the nozzle 14 and passageway 7, and when the water is ejected downwardly into the passageway 7 it will induce a flow of the surface water of the pool, including the debris thereon, into the open upper end of the passageway 7 for entrainment into the jet from nozzle 14, and the debris including the water in the passageway 7 will be ejected into the bag 16. The debris will then float upwardly into the compartments 19 where it will be held until the skimmer is lifted out of the water. The bag 16 will hold the debris upon lifting the skimmer out of the water and the bag can be removed to empty it or the debris can be shaken out of the bag through the central passageway 7 and the compartments 26 upon inverting the skimmer.

It will be noted that the material refloats into compartments 19 does not affect the buoyancy of the skimmer because such material is floating on a surface open to the atmosphere. In other words the original buoyancy of the skimmer remains unchanged throughout its operation as floatable debris is collected in compartments 19. This is important because, as seen in FIG. 4, any substantial vertical movement of the skimmer in response to a change in buoyancy would either raise channels 24 up to or above the water level preventing the desired movement of surface water to the vertically disposed conduit 7 or would lower said channels so far below the surface as to eliminate the entraining effect of nozzle 14.

Another desirable feature of the present invention is that the downward thrust of the jet from nozzle 14 during its operation will tend to raise or elevate the device in the water. Any air that may be entrained with the water will, of course, freely bubble out of the water in the compartments 26.

The channels 24 extending radially from the central passageway 7 (FIG. 2) confine the water to flowing between the walls 5 thus materially accelerating the velocity of the water at the skimmer thereby accelerating the flow of debris to the skimmer. The velocity of the water through the venturi passageway 7 will be dependent upon the water pressure, and, as stated, the device will operate under a head at the nozzle of only a relatively few pounds pressure to the full pressure of a city main or household system and higher.

It is, of course, apparent that the skimmer will automatically follow the water level in the pool, and will operate with equal efficiency at the different levels. No moving parts are required, and the device can be made of any suitable plastic or other material to resist corrosion and to withstand the effects of weather, etc.

It is also to be understood that the detailed description and drawings are not intended to be restrictive of the invention, but the claims are intended to cover all changes and modifications of the example of the invention herein chosen for the purposes of the disclosure, which do not constitute departure from the spirit and scope of the invention.

As one example of a modification, instead of floats 22, as seen in FIG. 6, the hose floats may be of cylindrical or spherical external contour as seen at 25 in FIG. 7 and may be centrally apertured for threading onto the hose 26, thus assuring the hose being supported on the water at the same level irrespective of turning or twisting of the hose. The number of floats so employed and their size with respect to the weight of the hose will, of

course, determine the level at which the hose is supported, which is preferably above the surface of the water to leave a space 27 so that the leaves and debris will float under it, rather than being caught by the hose. Obviously said floats may be of cork or hollow bodies, or of any suitable structure to make them buoyant.

It should further be noted that instead of employing the faucet 20 as the source of water under pressure, the hose 12 may be connected to the pressure side of the recirculation system for a swimming pool if desired.

It will also be apparent that a water pump independent of the domestic water supply and the recirculation system and driven by any convenient means may be incorporated in the above described system to provide the jet of water from nozzle 14. Such a pump may be part of the skimmer itself if desired.

FIG. 8 is illustrative of a skimmer that is a self contained unit including a pump P the intake side of which is connected with conduit 30 that extends into the water of the pool. The outlet conduit from pump P connects with the jet nozzle J that is in the same position as nozzle 14 and of the same structure. Motor M is connected by belt 31 with the pump P for actuating the latter, and a battery B having a switch S thereon is connected with motor M for actuating the latter.

While fresh water is not added to the water of the pool by the skimmer of FIG. 8, it is apparent that it will freely float under the influence of the atmospheric air to the same position in a pool the leaves and floating debris, which is usually at one end or the other of the pool or at one side or the other where it is easily reached by an operator at the end or side of the pool. If not, a gaff can readily bring it within reach of the operator for starting and stopping the motor through actuation of the switch.

Normally a protective removable cover (not shown) is over the motor and pump, the same being not shown in order to expose the operating elements.

I claim:

1. The method of removing floating solids from the surface of a swimming pool that comprises the steps of: inducing a flow of the surface water of said pool horizontally to a predetermined point for carrying said solids therewith to said point, then causing a down flow of said water at said point together with said solids into the water of the pool to a distance below the level of the water of said pool for refloating of said solids, confining the solids so moved downwardly within fixed limits adjacent to said point and permitting them to refloat to said surface of the pool adjacent to said point within said fixed limits and releasing the water that carried said solids to said point and downwardly thereat for mixing with the body of water in said pool free from confinement within said limits, and thereafter removing the solids so confined from said pool.

2. The method of removing floating material from the surface of a pool that comprises the steps of inducing a flow of the surface water of said pool including the material carried thereby horizontally to a predetermined point on said surface by injecting a stream of water downwardly into the water of said pool at said point, entraining said material in said stream for thereby moving said material downwardly into the water of said pool and immediately thereafter permitting the solids so entrained to float back to the surface of the water adjacent to said stream and confining said solids against freely mixing with the body of water in said pool while permitting the said stream of water to dissipate into the body of water of said pool and to intermingle therewith free from confinement, and finally removing the solids so confined.

3. The method of replenishing a swimming pool with fresh water and at the same time collecting floating solids on the water of said pool for removal therefrom that comprises the steps of, directing a jet of fresh water

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downwardly into the water of said pool at a point below the water level of said pool within a vertically open but horizontally confined path for establishing a flow of the surface water of said pool horizontally to said path and downwardly therein with said surface water and the said material carried thereby in entrainment with said jet, then permitting the fresh water of said jet to freely mix with the water in said pool while at the same time confining said solids to float at the level of said pool against free mixing with the remainder of said water for removal from said pool.

4. A skimmer for use in collecting debris floating on the water of a swimming pool, comprising: a member having a vertically extending passageway provided with an inlet at its upper end and an outlet at its lower end, a conduit for water under pressure having a downwardly directed discharge aperture positioned within said passageway to induce a flow of fluid through said inlet and downwardly through said passageway and out of the latter upon discharge of water from said aperture, a float connected with said conduit and said member arranged and adapted to float on the water of such pool and to support said member in a position with said inlet submerged under the water level when so floating and with said inlet in communication with the water around said float at said level whereby the surface water in such pool including the debris carried thereby will be induced to flow into said inlet and out of said outlet when water under pressure is discharged from said aperture, means for connecting said conduit with a source of water under pressure and a perforate walled enclosure carried by said float in a position around said outlet for collecting debris ejected from said outlet while permitting escape of water, a compartment carried by said float having an open lower end adjacent to said outlet for receiving reloaded debris discharged from said outlet, and the upper end of said compartment being open and spaced above the level of the water of such pool when said float floatingly supports said member in the water of said pool.

5. A skimmer for use in collecting debris floating on the water of a swimming pool, comprising: a member having a vertically extending passageway provided with an inlet at its upper end and an outlet at its lower end, a conduit for water under pressure having a downwardly directed discharge aperture positioned within said passageway to induce a flow of fluid through said inlet and downwardly through said passageway and out of the latter upon discharge of water from said aperture, a float connected with said conduit and said member arranged and adapted to float on the water of such pool and to support said member in a position with said inlet submerged under the water level when so floating and with said inlet in communication with the water around said float at said level whereby the surface water in such pool including the debris carried thereby will be induced to flow into said inlet and out of said outlet when water under pressure is discharged from said aperture, means

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for connecting said conduit with a source of water under pressure and a perforate walled enclosure carried by said float in a position around said outlet for collecting debris ejected from said outlet while permitting escape of water, a compartment carried by said float having an open lower end adjacent to said outlet for receiving reloaded debris discharged from said outlet, and the upper end of said compartment being open and spaced above the level of the water of such pool when said float floatingly supports said member in the water of such pool, means on said float for connecting the walls of said enclosure thereto, and the walls of said enclosure being suspended from said means below said float and said member.

6. A skimmer for collecting debris floating on the surface water of a pool for removal of said debris from such pool comprising: a perforate walled bag having an open upper end, a body having a vertically directed passageway open at its upper and lower ends and bag engaging means radially spaced from said passageway for supporting the open upper end of said bag spaced around the lower open end of said passageway, buoyant means connected with said body adapted to support the latter in the water of such pool with the open upper end of said passageway in communication with the surface water at the water surface level, and a conduit carried by said body having a downwardly directed discharge nozzle positioned within the upper open end of said passageway for inducing a flow of the surface water of such pool including the debris carried thereby into said open upper end and downwardly through said passageway and into said bag upon discharge of water under pressure from said nozzle, and means for connecting said nozzle with a source of water under pressure, said body including a compartment at one side of said passageway opening downwardly into the open end of said bag and having walls projecting above the level of the water in such pool when said buoyant means supports said body in the pool for collecting debris discharged from said outlet and reloaded to the surface of said water.

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