

May 28, 1963

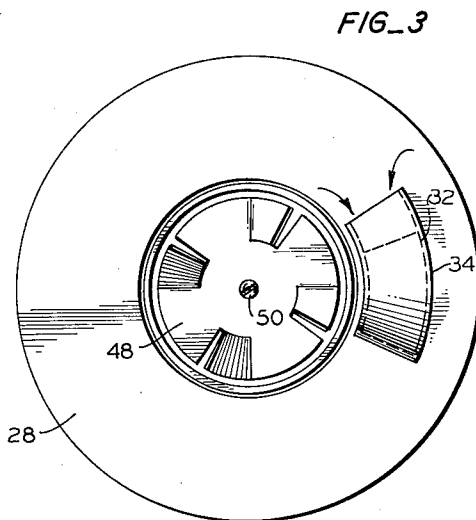
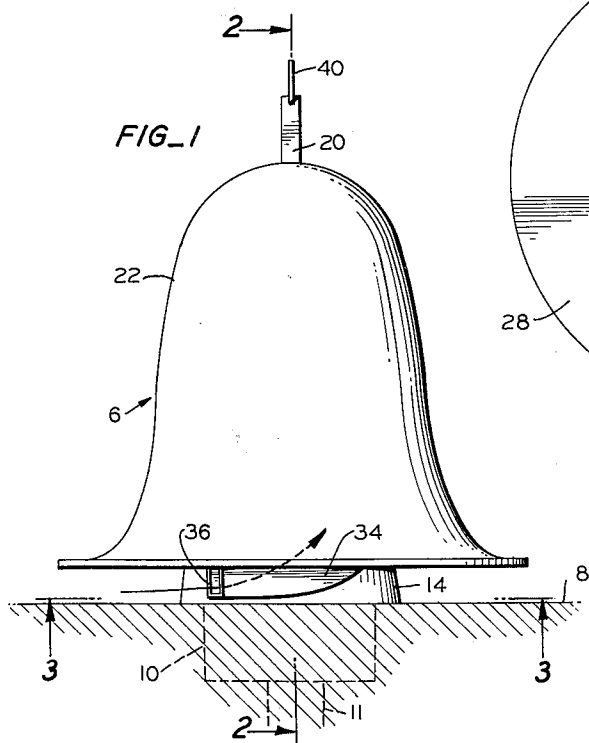
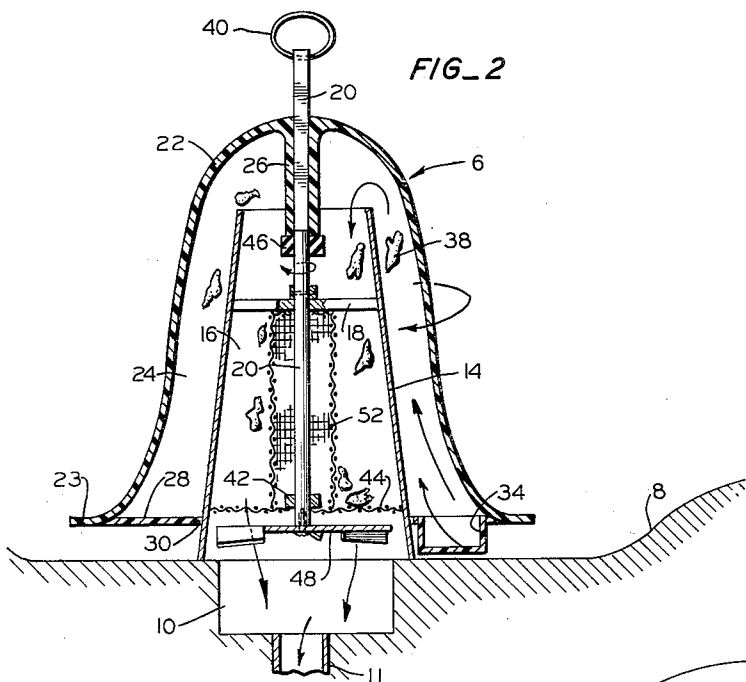
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PORTABLE LEAF TRAP FOR SWIMMING POOLS

Filed June 5, 1959

2 Sheets-Sheet 1



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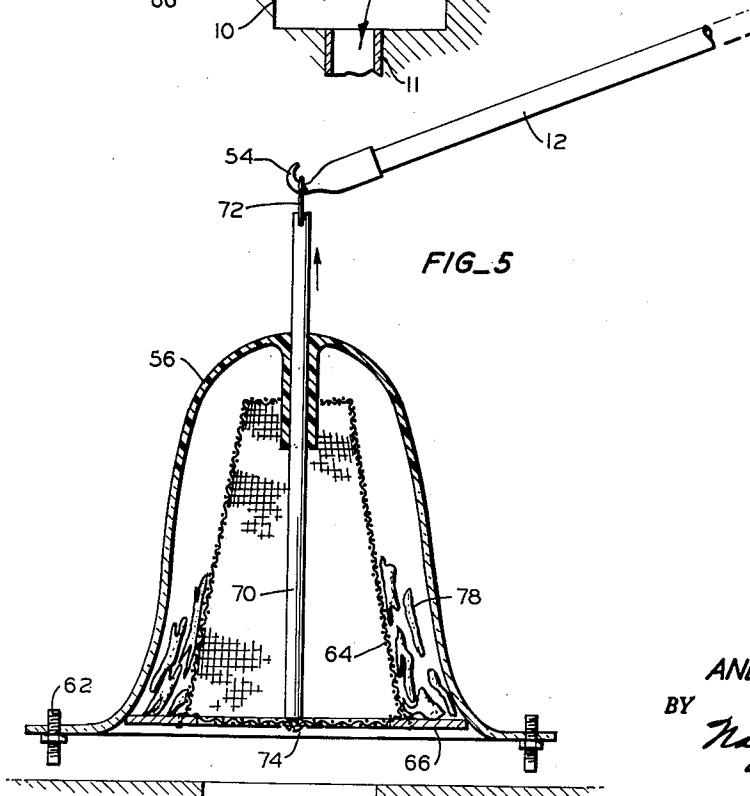
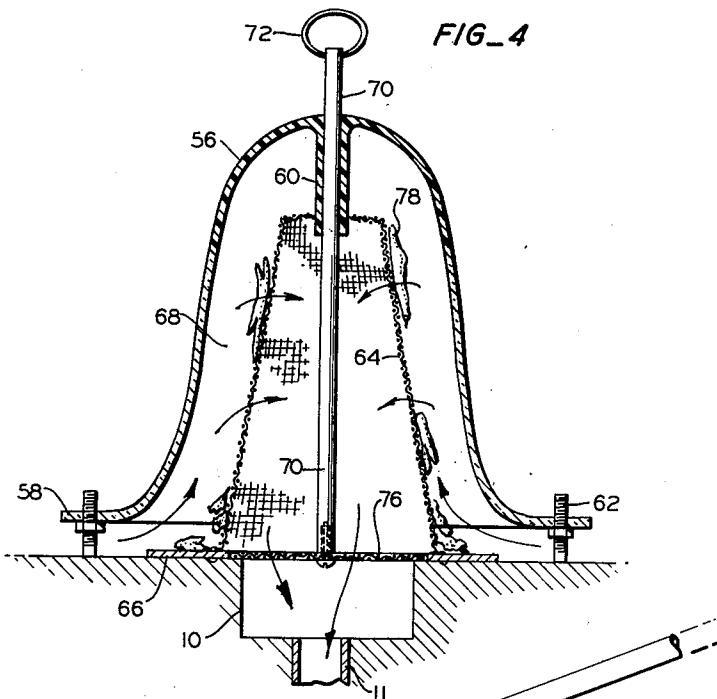
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PORTABLE LEAF TRAP FOR SWIMMING POOLS

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PORTABLE LEAF TRAP FOR SWIMMING POOLS

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This invention relates to equipment for the maintenance of swimming pools, and more particularly to a portable trap for the removal of leaves and the like from swimming pools.

It is an object of this invention to provide a portable trap for the pickup and retention of leaves and the like from the floors of swimming pools which utilizes the attractive force of the swimming pool drain or other pool outlet by concentrating such force in the immediate vicinity of the trap.

A further object of this invention is to provide a device of the character described, which is easily installed and removed from operating position within a water filled swimming pool and which requires no modification of existing pool installations for its use.

Another object of this invention is to provide a device of the character described, which is of relatively simple construction and inexpensive manufacture, being susceptible for make-up from a wide variety of materials, and which is a fully self-contained unit requiring no auxiliary hoses or the like for its operation.

Other objects and advantages of this invention will become apparent from the following description when taken in conjunction with the drawings, in which:

FIGURE 1 is a view in side elevation of the portable trap of this invention illustrated in operating position centered over a swimming pool drain.

FIGURE 2 is a view in section taken on the line 2—2 of FIGURE 1, with the arrows indicating the direction of rotation of the trap cover and the path of water flow from the pool through the trap into the swimming pool drain.

FIGURE 3 is a view in reflected plan taken on the line 3—3 of FIGURE 1 showing in particular, the vaned disk or impeller means utilized for effecting cover rotation responsive to the flow of water into the swimming pool drain.

FIGURE 4 is a view in section similar to that of FIGURE 2 illustrating a modified form of the invention in operating position centered over a swimming pool drain.

FIGURE 5 is a view in section similar to that of FIGURE 4 wherein the modified trap of that figure is shown undergoing removal from operation position.

Referring now to the drawings, the portable leaf trap of this invention, generally designated by the numeral 6, is shown in FIGURES 1 and 2 in operating position supported upon a swimming pool floor 8 centered over the inlet 10 of pool drain line 11. From these figures it may be noted that the trap 6 is a completely integral unit which, because of its utilization of the attractive force of the drain line 11 and its positioning proximate thereto, requires no hoses or other auxiliary attachments. Only during its positioning or removal from operating position is it necessary to use an auxiliary member such as the pole 12, illustrated in FIGURE 5, although it is desirable to drive the leaves on the pool floor into the immediate vicinity of trap 6 for pickup. This may be most readily accomplished by means of the "Automatic Swimming Pool Cleaner" disclosed in my co-pending application, Serial No. 734,772, filed May 12, 1958, now Patent No. 3,032,044. Generally the drain line 11 with which the trap is utilized constitutes the main drain of the swimming pool, being located at the lowermost level of the pool floor; however the trap may be used with other pool outlets hav-

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ing sufficient attractive force for leaf pickup and retention.

In FIGURES 1 and 2, trap 6 is shown as comprising a frusto-conical hollow support or core member 14 disposed upon pool floor 8 with its lower end completely encircling drain inlet 10 to prevent any water flow into the inlet from about said support member's lower end. Support member 14, which may be fabricated from a suitably rigid material, is open at its upper and lower ends, directly communicating at the latter with inlet 10 and forming an inner passage or conduit 16 for the water flowing from the pool into the inlet 10. An elongated web or rib member 18 is secured at its ends to the upper end of the side wall of support member 14, being disposed to extend diametrically thereof. Member 18 is provided with a centrally disposed aperture for the reception of shaft 20 and serves as a support therefor as hereinafter described, as well as a reinforcement for support member 14.

Cover 22 is of bell shape having an annular outwardly extending peripheral flange 23 and is fixedly secured for rotation to upright shaft 20, being maintained in concentric spaced relationship with respect to underlying support member 14 to form therewith an annular upwardly extending outer passage 24. The cover 22 may be fabricated from any suitably rigid material, however it is preferable that at least its lower portion be of a transparent material such as plastic to facilitate visual placement of the trap from pool side. Said cover is provided centrally of its upper end with a depending guide member 26, at the center of which is provided a square bore for the reception of the square upper end of shaft 20. An annular plate 28 is secured transversely of the lower end of cover 22 to effect closure thereof, being provided with a relatively large central aperture 30 for reception of support member 14. Also provided in plate 28 is an opening 32, FIGURE 3, of sector shape which provides for communication between the outer passage 24 and a scoop 34 depending from plate 28 inwardly of flange 23. Scoop 34 is provided at its lower end with a relatively small opening 36 of generally rectangular shape adapted for positioning with its lower end immediately adjacent the pool floor 8. Toward its rearward end, or to the right as viewed in FIGURE 1, scoop 34 is upturned on a radius to merge with plate 22 thereby forming a smooth entryway for leaves 38 drawn through opening 36 into the lower end of outer passage 24.

In FIGURE 2, shaft 20 is shown to be round at its lower end and square at its upper end, being provided at the latter end with a fixedly secured ring 40. The shaft 20 is vertically disposed, being journaled for rotation near its midpoint in the centrally disposed bore of the web member 18 and at its lower end in a bore vertically aligned beneath said web member bore provided centrally of a boss 42 fixedly secured at the center of a wire mesh floor 44 extending transversely of the lower end of support member 14.

A collar is pin-secured to shaft 20 near its midpoint to bear upon the upper surface of web member 18, serving as a thrust bearing to sustain the downward load of cover 22 and thereby fixing shaft 20 against downward axial movement relative to the support member 14. The square upper end of shaft 20, when received into the square bore of guide member 26, serves to lock the shaft to cover 22 preventing relative rotation therebetween. Sufficient freedom of axial movement is provided the square upper end of shaft 20 within the square bore of depending member 26 that cover 22 may be moved axially of said shaft and fixed relative thereto by means of a friction collar 46, of a material such as rubber, force fitted about shaft 20. This arrangement permits the clearance between the

scoop 24 and the swimming pool floor 8 to be varied as desired.

Means for driving the shaft 20 and the cover 22 in rotation include an annular disk or impeller 48 removably secured by means of a screw 50 to the lower end of shaft 20 for rotation therewith. As shown in FIGURE 2, the disk 48 is positioned beneath mesh floor 44 for protection from leaves entering into the inner passage 16 formed centrally of support member 14.

It may be noted that disk 48 is the only member limiting shaft 20 in axial movement upwardly relative to support member 14. By securing disk 48 through means of screw 50 for easy disassociation from shaft 20, the latter, together with cover 16, may be quickly removed from the support member 14 leaving the support member upper end open for the emptying of collected leaves and the like.

Included in the leaf entrapping means provided within support member 14 is the aforementioned wire mesh floor 44 which extends transversely to completely block the lower end of the support member 14, being secured at its outer margin to the wall thereof to entrap the leaves 38 moving downwardly in passage 16. Said entrapping means also includes wire mesh screening formed in a hollow cylinder 52 extending about a substantial portion of the lower end of shaft 20, which cylinder is closed at its upper end, being secured thereat, as by welding, to the underside of rib member 18 and at its lower end similarly secured to floor 44. By providing an upwardly extending perforate wall for cylinder 52, the attractive effect of the drain is maintained in passages 16 and 24 notwithstanding accumulation of leaves within the trap since the leaves collect primarily upon the surface of mesh floor 44.

Turning now to the operation of trap 6, a pole 12, FIGURE 5, having a hook 54 at its end for engaging ring 40 is utilized for placing the trap in the operating position shown in FIGURES 1 and 2 with the bottom of support member 14 girdling the drain inlet 10 of a water filled swimming pool. With the lower portion of the cover 16 transparent, such positioning may easily be accomplished manually from a pool side location. As drain line 11 is opened for the discharge of water from the pool through suction means in communication with said drain line, a current is caused to flow through the trap 6 in the directions indicated by the arrows in FIGURE 2. The placement of the support member 14 over inlet 10 with its lower end in continuous annular abutment with floor 8 assures that the entire suction or attractive force of drain line 11 will be directed through the trap which force is concentrated as a result of the provision of the relatively small opening 36 as the sole entry for water passing from the pool into the drain. This causes a current to sweep over the pool 8 in the vicinity of opening 36 moving leaves, and the like, 38 positioned upon said floor beneath peripheral cover flange 23 through opening 36 and into annular outer passage 24.

Traveling upwardly in passage 24, leaves 38 move over the upper lip of support member 14 to be directed downwardly into inner passage 16 in the direction of underlying drain 10. Passage of the leaves 38 is blocked near the bottom of support member 14 by the mesh screen 44 upon which the leaves collect. As previously indicated, provision of the central wire mesh cylinder 52 assures that a portion of the floor 44 will remain clear of leaves with permeability to water flow undiminished and the attraction of the drain effective notwithstanding leaf coverage of the outlying portion of floor 44.

As the water moves downwardly through passage 16 and into drain line inlet 10, the vaned disk 48 is caused to slowly rotate powering shaft 20 and cover 16 in rotation. Scoop 34 is thereby caused to sweep in a 360° arc over the pool floor 8 to variously direct the concentrated attractive force occurring at opening 36. Although this highly concentrated force is thus made effective over a 360° arc, its attraction of leaves and the like is limited

to an area of the pool floor 8 proximate to the trap. It is therefore desirable to broom the bottom of the pool to urge the leaves into the vicinity of the trap for pickup. The rotational feature of cover 22, however, makes it immaterial to which side of the cover the leaves are positioned.

After completion of the leaf pickup operation, the hook end of pole 12 is manually lowered into the pool for engagement with ring 40 and the trap lifted from the pool for leaf clean out. This is quickly accomplished, as indicated above, by removing screw 50 from threaded retention in the lower end of shaft 20 to release disk 48 therefrom, thereby permitting the cover 22 and the shaft 20 to be withdrawn as a unit from the support member 14 to leave the latter open at its upper end for emptying. The trap 6 is reassembled by installing shaft 20 in support member 14 and securing the shaft against upward axial movement by fixing disk 48 on the shaft by means of screw 50. Trap 6 is then ready for re-use.

In FIGURES 4 and 5 is shown a modification of the embodiment illustrated in FIGURES 1 and 2 which, like the latter, utilizes a bell shaped cover 56 provided at its lower end with an outwardly extending annular flange 58 and at its upper end with a centrally disposed depending guide member 60 having a central cylindrical bore. It will be noted, however, that unlike the earlier described embodiment, the cover 56 is completely open at its lower end and supported in spaced relationship with the pool floor 8 by means of a plurality of legs 62 threadedly secured at intervals about the periphery of flange 58 for adjusting the spacing between said cover and said floor.

A frusto-conical screening member or core 64 made up of wire mesh and provided at its lower end with an outwardly extending solid annular flange 66, is disposed beneath and in concentric relationship with cover 56, its tapered side wall being in spaced relationship with the cover to form an upwardly extending annular passage 68. A shaft 70 is slidably received at its upper end within the guide member 60 and provided thereat with a fixedly secured ring 72, and is at its lower end releasably secured by means of screw 74 to the center portion of perforate circular base member 76 of the frusto-conical screening member 64. Screening member 64 is permitted axial movement relative to cover 56 being carried therein upon shaft 70.

FIGURE 4 illustrates the trap in operating position for leaf pickup with screening member 64, its base 76 and its flange 66 resting upon pool floor 8. In this position a relatively small annular opening to passage 68 is formed about the lower end of cover 56 between its lip 58 and the pool floor 8. This opening acts in a manner similar to that of opening 36 of the FIGURE 1 embodiment in effecting a concentration of the attractive force of the drain line 11. FIGURE 5, on the other hand, shows the trap undergoing removal from operating position with screening member 64 having moved upwardly into cover 56 causing the outer margin of flange 66 to abuttingly engage the cover wall and entrap the leaves 78 in passage 68.

Operation of the FIGURE 4 embodiment, like the embodiment of FIGURE 2, starts with positioning of the trap centrally over the swimming pool drain line inlet 10, as in FIGURE 4, through use of the pole 12. The suction of drain line 11 is concentrated about the periphery of the cover 56 spaced from floor 8 to provide the relatively small annular opening to passage 68 through which the water must flow for passage from the pool into the inlet 10. With this arrangement the attractive force of the drain is concentrated to a somewhat lesser extent at the peripheral opening than in the case of the opening 36 in the embodiment of FIGURE 1. However, it is unnecessary to effect rotation of the cover 56 here, since the area of suction extends over an arc of 360°.

Legs 62 may be adjusted to vary the spacing between

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the cover and pool floor 8 thereby determining the size of the peripheral opening and the degree of concentration of the drain attractive force. The effectiveness of the trap is the result of the current which is caused to sweep over the pool floor 8 beneath the lip 58 and into the cover 56 carrying therewith leaves 78 into the annular passage 68 wherein they are trapped against the tapered side wall of screen member 64.

After completion of the leaf pickup operation, pole 12 is positioned with its hook 54 in ring 72, as in FIGURE 5, and the trap lifted from its position over the drain 10. Lifting of the ring 72 causes the shaft 70, to which it is secured, to move upwardly carrying with it the screening member 64 until the flange 66 of the latter abuttingly engages the cover 56 to seal off passage 68 against escape of the leaves 78 trapped in said passage. Removal of the trapped leaves is thereafter effected simply by releasing ring 72 and permitting the screening member to move downwardly until restrained by the abutment of ring 72 with cover 56. The passage 68 is thereby reopened and the trapped leaves 78 easily emptied from the bottom of the trap.

It will be appreciated that the embodiments of this invention as herein described may be altered, changed or modified without departing from the spirit or scope of the invention as herein claimed.

What is claimed is:

1. A portable leaf trap for swimming pools comprising a tubular support member open at its upper and lower ends and adapted for positioning over a swimming pool drain to define an inner passage extending upwardly therefrom, a dome-like cover positioned over said support member and carried for rotation by said support member and defining therewith an outer passage in communication with said inner passage, a plate member carried by said cover adjacent the lower end thereof, said plate member being disposed in embracing relation to said support member, an opening formed in said plate member in laterally offset relation to the longitudinal axis of said cover, said opening providing for flow communication between said pool and said outer passage and being adapted when said support member is positioned over the swimming pool drain to concentrate the attractive force of said drain and cause a current to sweep over the pool floor into said opening to urge leaves and the like therethrough and into said outer passage, perforate means carried by said support member and disposed within said inner passage for trapping said leaves and the like and preventing the same from entering said drain, and means carried by said support member, disposed beneath said perforate means, and having a connection with said cover for driving said cover in rotation responsive to the flow of water from the swimming pool into the drain, thereby to cause said opening to sweep in an arc over the swimming pool floor to receive leaves and the like.

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2. The combination of claim 1 including a scoop member depending from said plate member and adapted to urge water upwardly through said opening as said cover rotates.

3. The combination of claim 1, wherein said cover and said driving means are secured for rotation to a common shaft carried in rotation by said support member, and said perforate means is disposed to prevent contact of said leaves with said driving means.

4. The combination of claim 3, wherein said support member is of hollow frusto-conical shape and is provided with an interior cross member for carrying said shaft in rotation, said driving means comprising a vaned disc disposed near the lower end of the support member, and said perforate means include a perforate base member which extends transversely of the lower end of the support member above the driving means and a perforate closed cylindrical member which extends upwardly from said base member to embrace a substantial portion of said shaft.

5. A rotary leaf sweeper adapted to sweep up leaves from the immediate vicinity of the main drain line of a swimming pool and to entrap said leaves comprising a dome-like cover having an annular bottom wall, a relatively small opening in said bottom wall disposed in laterally offset relation to the longitudinal axis of said cover, an open-ended tube disposed in substantially axial alignment with said inlet, said tube having its lower end supported by the bottom wall of said pool in surrounding relation to the inlet of said drain line and having its upper end extending a substantial distance within said cover past said annular bottom wall of said cover, shaft and shaft bearing means interconnecting said tube and said cover enabling rotative movement of said cover about a longitudinal axis of said inlet, screen means disposed within said tube operable to remove leaves and other pool debris from water flowing between said opening and said inlet, and impeller means carried by said shaft means and disposed in the path of flow of the water passing between said opening and said inlet operable to effect directional changes in said flow and thereby impart rotary movement to said cover.

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