Feb. 1, 1955 O. M. KING 2,701,235

OPERATING SYSTEM FOR SWIMMING POOL

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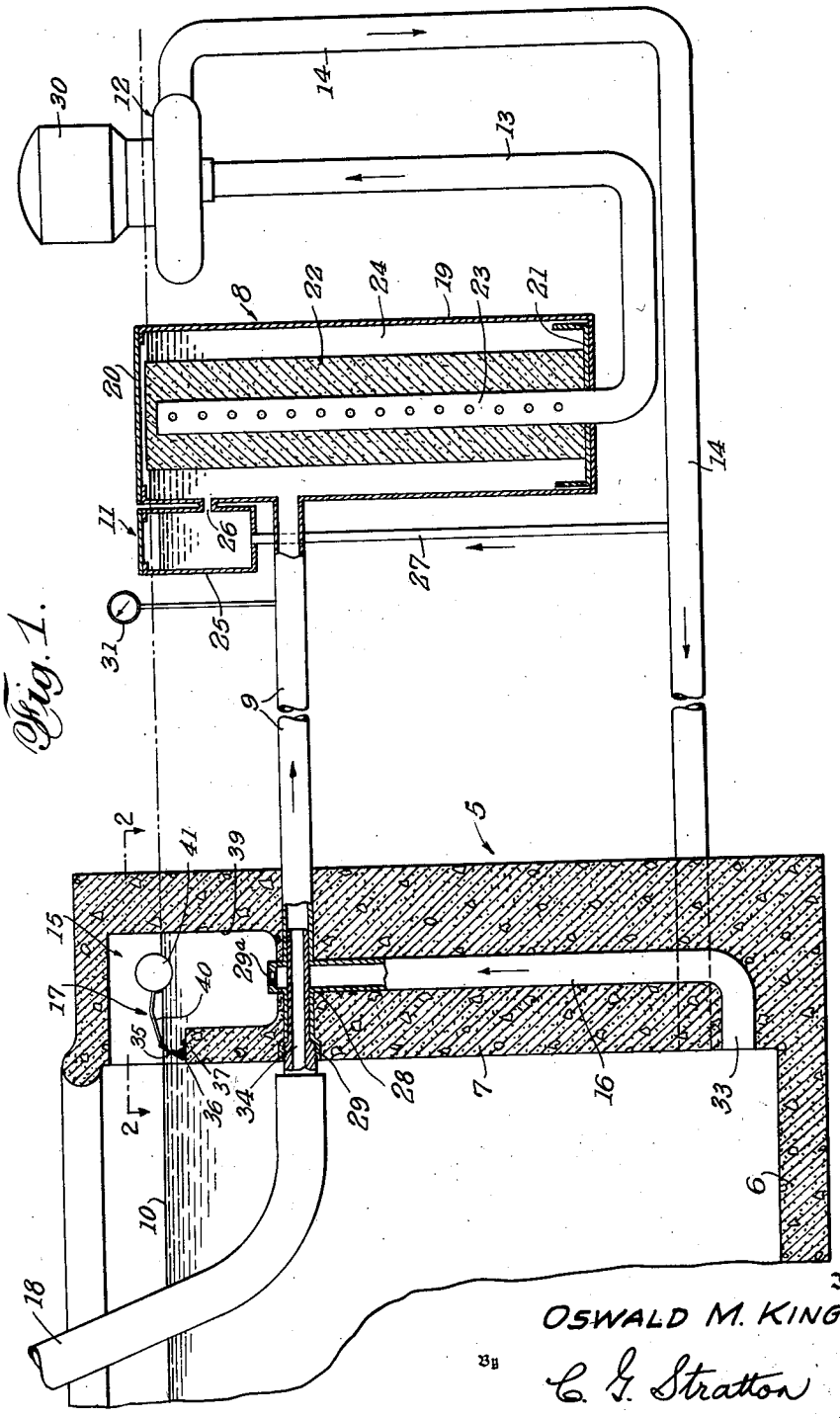



Fig. 1.

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Fig. 2.

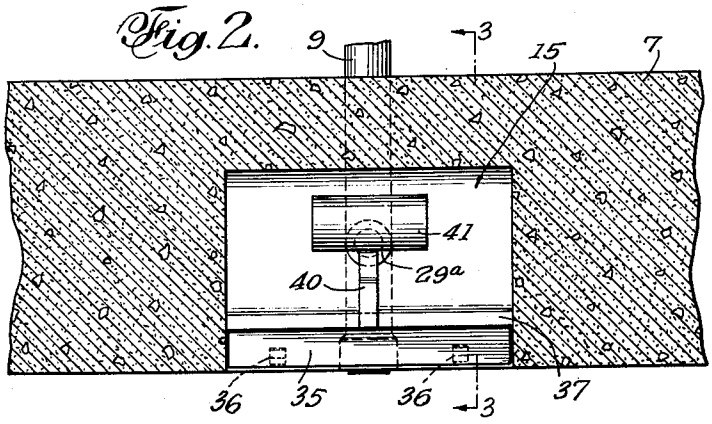
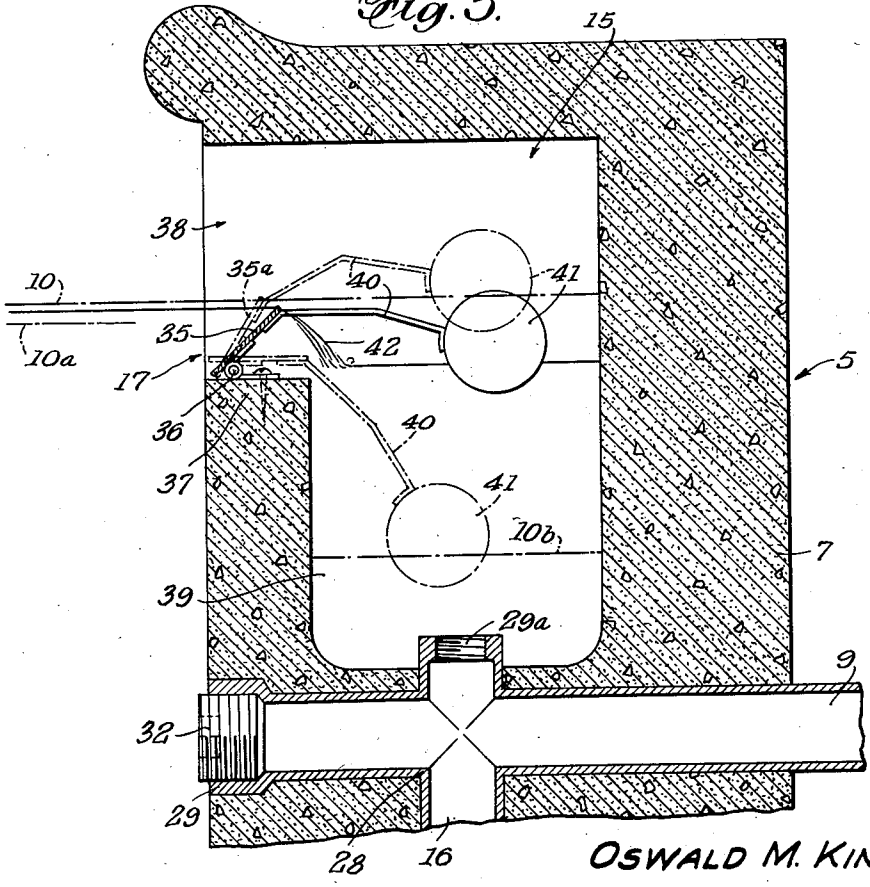



Fig. 3.




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# OPERATING SYSTEM FOR SWIMMING POOL

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9 Claims. (Cl. 210—11)

This invention relates to an operating system for a swimming pool, the same comprising circuit means to filter the water of the pool and introduce additional filter media, vacuum-clean the bottom of the pool, and skim the surface thereof.

The invention is characterized by both low cost of installation and simplicity of operation to thereby provide a system especially adapted for small residential-type swimming pools, the invention contemplating the elimination of all valves, reduction of piping that interconnects the pool and maintenance means, elimination of backwash disposal, reduction in size and cost of the maintenance means with a resulting saving of space, simplification of pool cleaning and water filtration, and obviation of the need for employing professional pool services and the expense attending the same.

An object of the present invention, therefore, is to provide an operating system for a swimming pool that is valveless and of such extreme simplicity that the owner or any non-professional can readily maintain the same clean and filtered, as desired.

While the larger public and semi-public pools are provided with circumscribing gutters, the expense attending the provision of such continuous gutters for residential pools is quite great and the same, more frequently than not, are omitted. Such lack of gutters presents a problem for skimming off dust, leaves and other matter, before the same settle beneath the water surface of residential pools.

Accordingly, another object of the present invention is to provide novel and simple surface-skimming means for gutterless pools, the same, when set in operation, being fully automatic to break the surface tension of the water and effectively draw off surface debris in an efficacious manner.

The invention also has for its objects to provide such means that are positive in operation, convenient in use, easily installed in a working position and easily disconnected therefrom, economical of manufacture, relatively simple, and of general superiority and serviceability.

The invention also comprises novel details of construction and novel combinations and arrangements of parts, which will more fully appear in the course of the following description. However, the drawings merely show and the following description merely describes one embodiment of the present invention, which is given by way of illustration of example only.

In the drawings, like reference characters designate similar parts in the several views.

Fig. 1 is a cross-sectional view of a portion of a swimming pool equipped with apparatus embodying the herein-contemplated pool-maintaining system.

Fig. 2 is an enlarged plan sectional view as taken on line 2—2 of Fig. 1, the same showing skimming means employed in the invention.

Fig. 3 is a further enlarged and fragmentary sectional view on line 3—3 of Fig. 2, and showing various operative positions of the skimming means.

The pool 5, except for the hereinafter-described improvements, is generally conventional, being shown as formed of concrete and having a floor 6 and side walls 7.

The present system comprises, generally, a filter unit 8, an upper flow pipe 9 connecting said unit and the pool 5 somewhat below the surface 10 of the water in the pool, filtrate feeding means 11 associated with unit 8, a pump 12, a flow line 13 connecting the inlet side of said pump and the filter unit 8, a flow line 14 connecting the outlet side of said pump and the pool adjacent the floor 6 thereof, a gutter-like recess 15 formed in one side wall 7 adjacent the top thereof, a flow line 16 extending from a point adjacent the pool floor 6 and in communication with flow line 9 and recesses 15, and float-controlled weir means 17 operating in pocket or recess 15 and effective to skim debris from the pool water surface 10. The foregoing are the permanently installed components of the system. In addition, there is provided a suitable and standard portable vacuum pool cleaner that is exemplified by its discharge hose 18, and certain plugs for flow lines 9 and 16 which will be hereinafter described.



Filter unit 8 comprises a shell 19 having a removable top cover 20, a debris-collecting tray 21 within the shell at the bottom thereof and a filter cartridge 22 supported on said tray and extending to the top of the shell. Line or pipe 13 has a perforated end 23 residing within cartridge 22 and the latter is of such diametral size as to afford an annular chamber 24 in the shell.

Cartridge 22 may be of the screen type, bed type, or be of the type that embodies a diatomaceous earth and, in the drawing, is shown merely in exemplary form since any suitable type of cartridge or unit may be used.

The filtrate feeding means 11 is also generally conventional, being shown as a container 25 for filter media and having a feed connection 26 to shell 19. Also, a water flow connection 27 is provided from line 14 to the bottom of said container.

It will be noted that flow lines 9 and 16 intersect at a cross-connection 28, that the end of line 9 that terminates at the inner side of pool wall 7, is internally threaded at 29, and that the upper end of flow line 16 has a restricted orifice 29*a* that is also internally threaded.

Whether placed adjacent to the pool or remote therefrom, filter unit 8 and pump 12 are positioned to be below the level 10 of water in the pool, as indicated in Fig. 1. Thus, all of the filter cartridge 22 is effective to filter water passing thereinto from line 9 and the pump 12 operates at best efficiency since it merely circulates the water and does not need to lift the same above the level in the pool as would be the case if in an elevated position relative to the pool. Since the water in shell 19, in the upper end of line 14, and in the pump, will seek the level of the water in the pool, the same, during the static condition of the system, will be water-filled, as indicated. Also, when the pump is started by its motor 30, there is no lag in the start of the circulation of the water.

A gauge 31 is provided in line 9 to indicate diminishing of normal flow in said line as will result from a clogged condition of filter unit 8. At such time, the cover 20 is removed so that the cartridge 22 and tray 21 may be extracted from shell 19 and cleaned of accumulation and encrustations before replacement in the shell.

In contradistinction to the multiplicity of pipes and valves employed in prior pool-maintaining systems, only two pipes 9 and 14 connect the pool 5 and the pump and filter. The simplicity of the present system will be evident.

For normal filtering of the pool water, a plug 32 is inserted in the threaded end 29 before the pump motor 30 is started up. Since the deep end 33 of line 16 is larger than restricted orifice 29*a*, water from the bottom of the pool will circulate through lines 16 and 9, into shell 19, through filter cartridge 22 into pipe end 23 and line 13 to pump 12, and out from said pump back into the pool through line 14. A smaller proportion of water will be drawn from recess 15 through orifice 29*a*. All of this circulating water passes through the cartridge 22 and is filtered thereby. The residue is either intercepted by the cartridge, if small enough to effect partial penetration, or, if larger, is accumulated in chamber 24 of the shell 19.

During the above circulation, line 14, being on the outlet side of the pump, is under greater pressure than is line 9 and chamber 24, this increased pressure in line 14 resulting from discharging into the pool against the head of water in the latter. Consequently, pressure will build up in connection 27 and flow from container 25

of filter media to chamber 24 will occur. Since connection 27 is relatively small, such filtrate flow will be small accordingly and will continue during operation of the pump.

When it is desired to vacuum-clean the pool, i. e., to remove bottom-accumulated sediment, plug 32 is removed and an adapter 34 on the end of hose 18 is inserted into line 9 and connected to threads 29, said adapter being of such length as to close cross-connection 28 and thereby close off pipe 16 and its ends 29, 29*a* and 33. The suction end of the vacuum pool cleaner is moved along the floor 6 of the pool while the pump is operating to force water and sediment discharged from hose 18 into line 9 to circulate, as before, through the filter and pump back to the bottom of the pool through line 14. The cartridge intercepts said sediment and filters the water passing therethrough, the latter also picking up additional filtrate from container 25 as before.

The weir means 17, by means of which the surface of the pool water is skimmed, comprises a weir plate 35 carried by a horizontal pivot 36 that is mounted on a ledge 37. Said ledge is the lower defining portion of an opening 38 that communicates the interior face of the pool with pocket 15, the latter having considerable depth below ledge 37 to constitute a well 39 into which the orifice end 29 of flow line 16 slightly extends.

The pivot 36 is connected to weir plate 35 along one longitudinal edge of the latter and to the opposite edge there is affixed an arm 40 that extends into the pocket 15 and carries a float 41. Arm 40 is bendable so that the float may be adjusted relative to the weir plate during installation.

In order to draw debris from the water surface 10, the surface tension of the water must be broken to establish a flow in the direction of pocket 15. Normally, the float 41 is buoyed up by the water in the pocket and holds the weir plate 35 in its most erect position as at 35*a* with its free longitudinal edge somewhat above the level 10 of the water in the pool, the arm 40 having been adjustably bent to achieve this position of the weir plate. Thus, the latter forms a barrier to re-entry of debris in the pocket back into the pool.

The present arrangement allows for a variation in the level 10 which is here shown at approximately its maximum level, it being evident that a lower level, as suggested at 10*a*, will result only in an increased rearward slope of the weir plate 35, provided, of course, that the level is not below ledge 37.

Skimming occurs during the above-described normal filtering of the pool water and when plug 32 is in place. When pump 12 is started up, the level of water in pocket 15 is lowered because the pump draws the same through line 9 while drawing water from the pool bottom through line 16. Immediately upon such lowering of the level in the pocket, the weir plate will tip down responsive to the downward movement of float 41 and water from the pool will cascade into the pocket to replenish the water thus removed. The full line position of Fig. 3 shows this new position of float and weir plate wherein a waterfall or cascade 42 pours over the tipped edge of the weir plate and establishes flow of floating debris from the pool into the pocket. So long as the pump continues to operate, this condition will prevail. Filter unit 8, of course, intercepts the debris thus removed and the water is returned to the pool through flow line 14 as before.

The well 39 is provided to insure that suction to the pump is not broken regardless how rapidly the pocket 15 is depleted of water and before such depletion can be replaced by water passing over the weir plate. Thus, under conditions where the level in the pocket is as low as shown at 10*b*, the suction will not be broken, since the weir plate is substantially horizontal and offers minimum interception of water flowing into the pocket from the pool and, therefore, maximum replenishment of the pocket.

When the pump is stopped, the level in the pocket will restore itself to that in the pool and the weir plate will serve as a barrier to such debris as may remain in the pocket.

While the invention that has been illustrated and described is now regarded as the preferred embodiment, the construction is, of course, subject to modifications without departing fram the spirit and scope of the invention. It is, therefore, not desired to restrict the invention to the particular form of construction illustrated and described, but to cover all modifications that may fall within the scope of the appended claims.



Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. A valveless system for maintaining a swimming pool, wherein the pool is provided with a normal water level located near its top, comprising a flow circuit including a filter and a pump and terminating in two flow lines, one of which enters the pool adjacent its floor and the other nearer the top of the pool and below a horizontal plane representing the normal level of water in the pool, the latter flow line extending through the filter to the inlet side of the pump and the former flow line connecting to the discharge side of the pump, and an upwardly directed flow line from the lower portion of the pool and extending to form an intersection and to communicate with said latter flow line, both the filter and pump being disposed below said horizontal level, a plug to close the end of said latter line so that the pump circulates water from the lower portion of the pool through the filter and back to said lower portion, and a tubular fitting extending into said line end to close the mentioned intersection so that the pump circulates water from said tubular fitting through the filter and back into the lower end of the pool.

2. A pool-maintaining system according to claim 1, in which a filtrate-supplying unit is connected between the flow line passing the discharge of the pump and the filter whereby the pressure in said flow line is transmitted to said unit to effect discharge of filtrate therefrom into the filter.

3. A pool-maintaining system according to claim 1 in which one wall of the pool is provided with a pocket having an opening for communication with and receiving water from the pool, an upper extension on the upwardly directed flow line to receive flow from said pocket, and a float-controlled pivoted weir plate extending across the opening of said pocket and responsive to a difference of level between the water in the pool and the water in the pocket to tilt on its pivot between a position arresting flow from the pool to the pocket and a position allowing such flow.

4. In a swimming pool structure having water-circulating and filtering means, wherein the pool is provided with a normal water level located near its top, an outlet flow line connected to said structure nearer its upper end and below a horizontal plane representing the normal level of water therein, an inlet flow line connected to said structure adjacent its bottom, said flow lines constituting the respective inlet and outlet connections of the water-circulating and filtering means, an upwardly directed flow line extending from a lower portion of the pool structure, through a wall thereof, and into intersecting communication with the outlet flow line, means to plug the pool end of the outlet flow line so that with the pump operating, flow therethrough is had only from the upwardly directed line, and a fitting to close the intersection of the outlet and upwardly directed flow lines so that the latter line is closed to flow and the outlet line receives flow from the fitting.

5. Mechanism for skimming debris from the surface of water in a swimming pool comprising a pocket provided in a wall of the pool and having an upper opening communicating the pocket and the pool, a weir plate extending transversely across said opening in the pocket, a pivot connecting the lower end of said weir plate to said wall and in the lower part of said opening, and a float carried by the upper free end of said plate and disposed in and buoyed by the water in the pocket and responsive to a difference of level of water in the pocket to raise and lower the weir plate on its pivot accordingly.

6. Mechanism for skimming debris from the surface of water in a swimming pool comprising a pocket provided in a wall of the pool and having an upper opening communicating the pocket and the pool, a weir plate extending transversely across said opening in the pocket, a pivot connecting the lower end of said weir plate to said wall and in the lower part of said opening, a float carried by the upper free end of said plate and disposed in and buoyed by the water in the pocket and responsive to a difference of level of water in the pocket to raise and lower the weir plate on its pivot accordingly, and a bendable connection between said weir plate and float to relatively adjust the same.

7. Mechanism for skimming debris from the surface of water in a swimming pool comprising a pocket provided in a wall of the pool and having an upper opening communicating the pocket and the pool, a weir plate extending transversely across said opening in the pocket in an angular position directed toward the pocket to constitute a tilted barrier to flow between the pool and pocket, a pivot connecting the lower end of said weir plate to said wall and in the lower part of said opening, and a float carried by the upper free end of the weir plate and disposed in and buoyed by the water in the pocket to hold said position, said float, upon depletion of water in the pocket, falling further into the pocket accordingly to increase the tilt of the plate on its pivot and institute a cascade of water thereover from the pool to replenish the water in the depleted pocket.

8. Mechanism according to claim 7 in which the pocket is formed with a well into which the float moves upon extreme depletion of water from the pocket to thereby allow the weir plate to tilt to its lowermost position offering minimum interference to flow from the pool into the pocket and, therefore, maximum replenishing flow of water from the pool to the pocket.

9. In a pool, a pocket provided in a wall of the pool, said wall being formed with an upstanding ledge separating the pool and the pocket, a weir plate mounted on said ledge and comprising an upper extension of said ledge, a pivot connecting the ledge and the lower portion of the weir plate whereby the latter is adapted to swing, and a float carried by the weir plate and disposed in and buoyed by water in the pocket to swing the weir plate between substantially erect and tilted positions according to the amount of water in the pocket to, thereby, control flow from the pool over the top of the weir plate.



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