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CLEANING AND AERATING CIRCULATORY SYSTEM FOR SWIMMING POOLS

Filed March 17, 1961

2 Sheets-Sheet 1

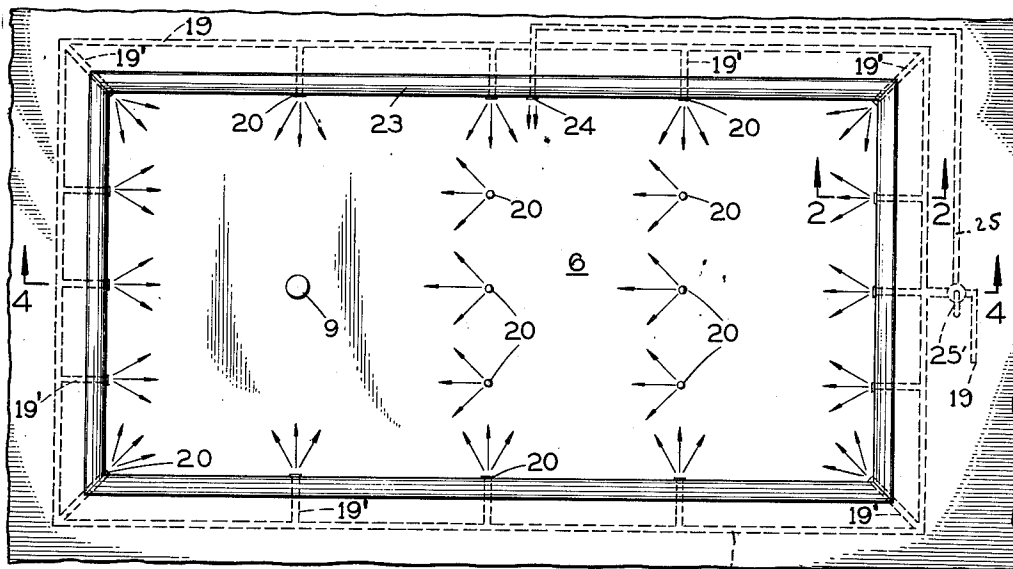


FIG. 1

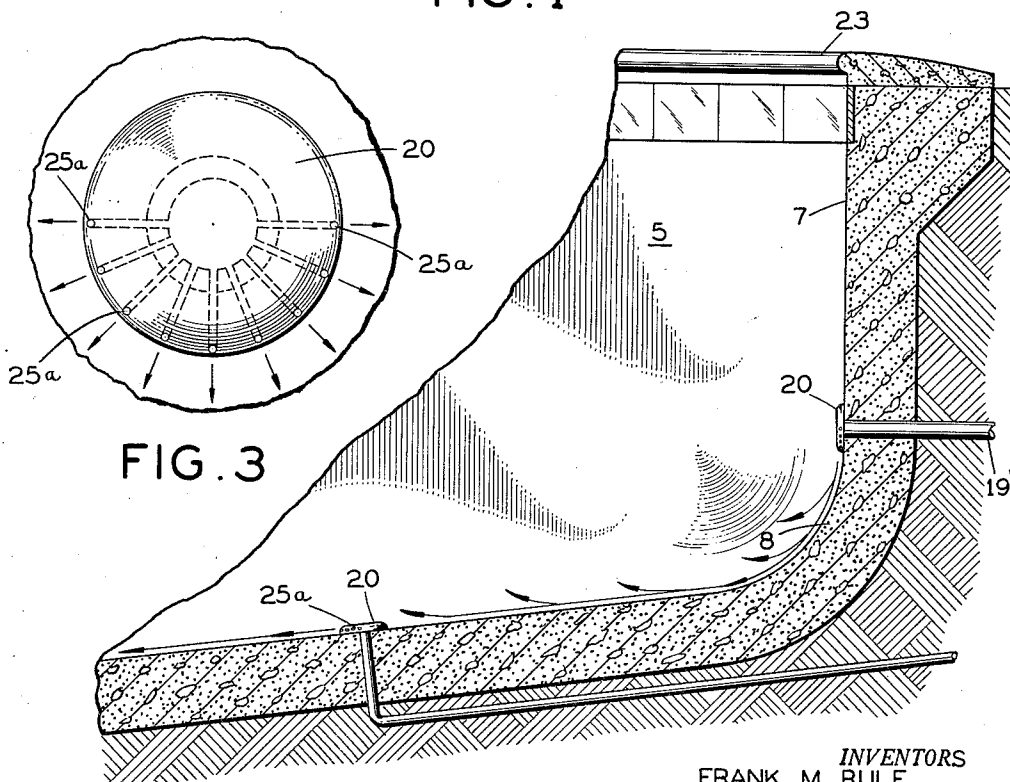


FIG. 3

FIG. 2

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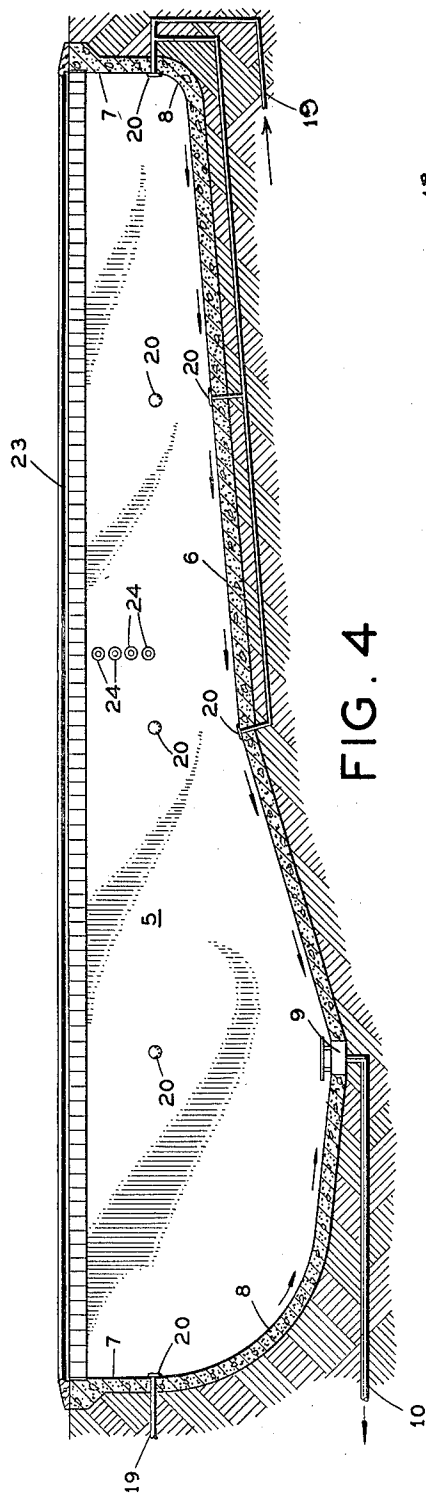


FIG. 4

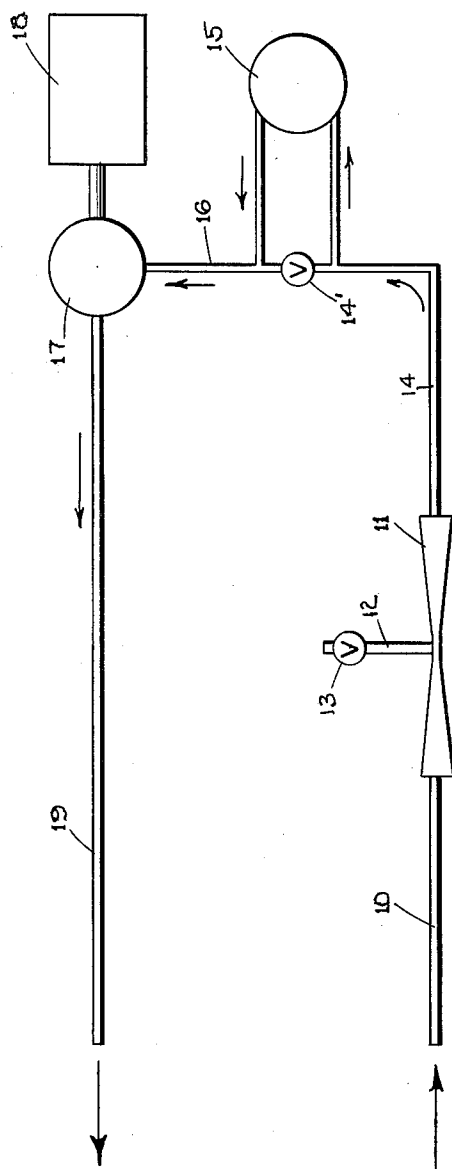


FIG. 5

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## CLEANING AND AERATING CIRCULATORY SYSTEM FOR SWIMMING POOLS

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4 Claims. (Cl. 210-169)

This invention relates to swimming pools and particularly to a circulating water system therefor.

Swimming pools have heretofore been provided with circulating systems whereby the water is pumped from a drain fitting, under the influence of a pump, directed through a filter bed after which it is forcibly injected back into the pool at predetermined points in the walls and bottom of the pool.

The prime purpose of this invention resides in the construction of a swimming pool that is formed of concrete or the like and that has no sharp corners between the side walls and the bottom, creating a smooth uninterrupted surface from the side walls to the bottom of the pool to facilitate the cleaning action of injector heads, all directed in a direction toward a lower downwardly disposed drain opening in a common direction whereby the walls and the bottom of the pool are successfully cleaned of any accumulation of dirt and other foreign matter that may fall within the water, such as grass, leaves, particles of other foreign matter that are blown into the water by the wind. Furthermore in the pools where the growth of algae is experienced, the feet of bathers tend to release it from adherence with the basin and some of this vegetation or other foreign matter remains sustained in small particles in the water and some of it goes to the bottom, thereby producing a slimy sediment which is quite readily agitated by action of the bathers and caused to be mixed with the water.

The circulating system of the present invention resides in novel inlet heads that are apertured in a direction to force the water under pressure from the filter into the pool to be continuously directed toward the outlet drain thereby, successfully and continuously washing the walls and bottom and maintaining the pool in a sanitary condition free of any normal accumulation upon the bottom that has heretofore been difficult to remove, other than by brushing or vacuum cleaning the pool at frequent intervals.

The invention further contemplates novel air injecting means in to the return circulatory system whereby the injected water is caused to aerate by a multiplicity of air bubbles from each inlet to give the pool a "charged" or carbonated effect. Further, certain inlets are arranged upon one or both sides of the pool that are also connected with the circulatory system and that have the effect of a high velocity under water massage. The several inlets from the circulatory system are of such shape and size that they will be disposed upon the inner sides, the ends and the bottom of the pool and to project a minimum distance into the pool so as to avoid any abrupt nozzles or other fixtures that might possibly cause damage to the feet or body of the bathers.

Novel features of construction and operation of the device will be more clearly apparent during the course of the following description, reference being had to the accompanying drawings wherein has been illustrated a preferred form of the device and wherein like characters of reference are employed to denote like parts throughout the several figures.

In the drawings:

FIGURE 1 is a plan view of a swimming pool constructed in accordance with the invention,

FIGURE 2 is an enlarged fragmentary vertical sectional view taken substantially on line 2-2 of FIGURE 1,

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FIGURE 3 is a greatly enlarged face view of one injector head,

FIGURE 4 is a longitudinal section taken substantially on line 4-4 of FIGURE 1, and

FIGURE 5 is a diagrammatic illustration of the circulatory mechanism.

Referring specifically to the drawings, there has been illustrated a generally rectangular concrete swimming pool, having side walls 5 and an inclined bottom 6. The end and side walls 7 and 5 at their point of meeting with the bottom wall are rounded in cove shape 8. The bottom wall 6 is inclined from a shallow end to a substantially deep end and intermediate the deep end the bottom has been provided with a high velocity anti-vortex outlet fitting 9. The fitting 9 is connected to a conduit 10, that has connection with one end of a venturi tube 11 of conventional construction. The opposite end of the venturi tube has communication with a conduit 14 and the conduit 14 communicates with a conventional filter element 15 and from the filter element 15, a conduit 16 communicates with the suction side of a circulating pump 17, driven by a conventional prime mover, such as an electric motor 18. The outlet side of the pump 17 communicates with a conduit 19. The venturi tube 11 has communication with an air inlet tube 12, controllable by an adjustable valve 13. The traverse of the fluid from the conduit 14 through the filter 15 is controllable by a valve 14' thus, fluid being discharged from the fitting 9 under the suction influence of the pump 17, flows through the conduit 10, passing through the venturi tube 11, where it picks up air from the air tube 12 and then continues its suction flow through the conduit 14 and bypassed through the filter 15 and to the suction side of the pump 17, where it is then discharged into the conduit 19. The conduit 19 surrounds the swimming pool and has communication through the medium of laterals 19' to a multiplicity of inlet heads 20, see particularly FIGURE 3 and, since the water entering the conduit 19 has been aerated during its passage through the venturi tube 11, there will be a discharge of the aerated water through the several inlet heads 20. Any suitable coping 23, will obviously extend around the upper marginal portion of the sides and ends of the pool, as is customary.

Disposed within one or both sides of the side walls 5, substantially intermediate the length of the pool and at a point where a person may normally stand erect upon the bottom 6, are a plurality of inlet jets 24, such jets 24 being connected to the circulating conduit 19 by a bypass conduit 25. The jets 24 function to inject at relatively high velocity air carrying streams of water laterally of the pool to function as an underwater massage, while the other inlet heads 20 also permit the air and water to maintain an effervescency appearance of the water as the main streams from the members 20 are directed in a common direction toward the outlet 9, with the air escaping therefrom to rise toward the surface in a multiplicity of small air bubbles.

As will be clearly obvious from FIGURE 4, the several inlet heads shown upon the side walls and end walls 5 and 7 are provided with a plurality of outlet openings 25a for substantially half the circumference whereby relatively minute streams of water will be directed in a fan-shape downwardly along the side walls and around the coves 8 to flow along the surface of the bottom 6, such being indicated by the several arrows. The several heads 20 are relatively thin and rounded at the marginal edge so as to have a relatively small projection into the pool and to remove any sharp edges that might constitute a hazard to the bathers. The heads 20 in the bottom of the pool, are all directed in a common direction toward the outlet 9 and it will be apparent, that the several inlet heads 20 function to form a continuous washing effect to

the side and end walls and the bottom, all directed toward the high velocity suction outlet 9, successfully removing any accumulation of foreign matter from the walls and bottom of the pool, all of which are washed to a common discharge point, represented by the outlet 9 where it is conveyed under the influence of the pump 11 through the outlet conduit 10 and then bypass through the filter element 14 where it is again returned to the pool through the conduit 19. While the heads 20 have been illustrated as having a plurality of radial apertures 25a, it will be clearly apparent that the marginal edge of the heads 20 may be slotted so that the water will flow from the heads in a thin fan-shape stream rather than a plurality of individual streams from the openings 25a.

In the use of the device, the system is assembled as illustrated and the pump and filter mechanism may be arranged at any convenient point for full access to the operator of the mechanism. With the pool properly filled with water, the circulation system is energized by the pump 17 under the influence of the motor 18, pulling the water through the high velocity suction fitting 9, through the conduit 10 to the venturi 11 and then bypass through the filter 14 where it flows through the conduit 16 to the suction side of the pump 17 and from the discharge side of the pump 17 to the conduit 19, where it is connected to and flows from the several injector heads 20 and the injector nozzles 24. The degree of air entering the circulatory system and the venturi tube 11 may be effectively controlled by the control valve 13. As the water flows from the pump 17, to the conduit 19, aerated pressurized water will be forced from each of the heads 20, effectively flowing down the side and end walls and along the bottom and agitated and effectively removing any sediment or cumulation that normally might be deposited upon the bottom and since the side and end walls are connected to the bottom 6 by coves 8, there will be no sharp corners for the accumulation of the foreign matter and the constant flow directs all sediment and impurities in one direction toward the outlet 9. The device is most effective as a means for circulating the water from a swimming pool and substantially eliminates the necessity for the frequent brushing or vacuum cleaning of the pool and, inlet devices for swimming pools presently in use have no effective cleaning action with respect to the walls and bottom and it has necessitated a rather tiresome and frequent brushing of the pool walls and bottom. The injector nozzles 24 have a most beneficial effect from a therapeutic standpoint and the bubbling action of the water being discharged from the heads 20 also give a most pleasing effect to the water in the pool, such having an effervescent or carbonated appearance. The system is simple, relatively cheap to manufacture and install and is most effective as a simple means for maintaining the pool in a sanitary condition. The conduit 25, leading from the circulating conduit 19 may be controlled by a suitable valve 25', such being desirable when the jets 24 are to be actuated as therapeutic devices and where the major pressure of the water would be most effective. When the valve 25' is closed, it will be apparent that the entire pressurized water from the filter and conduit 19 will be directed through the conduit 25, all other injectors possibly being inactivated. In normal operation however, all of the injector heads 20 function in a continu-

ous manner as before pointed out. The use of the valve 25' thus establishes means for controlling the pressure from the nozzles 24.

It is to be understood that the invention is not limited to the precise construction shown, but that changes are contemplated as readily fall within the spirit of the invention as shall be determined by the scope of the subjoined claims.

Having described our invention what we claim as new and desire to secure by Letters Patent is:

1. In a swimming pool for use with a water circulating system, said pool including flat side walls and a bottom wall, said bottom wall including an intermediate sump, said sump including a pool outlet in the floor thereof, portions of said bottom wall surrounding said sump progressively sloping toward said sump, said side walls merging into said bottom wall in a curved cove portion, a plurality of relatively flat nozzles spaced about the inner surface of said side walls for connection to the inlet of said water circulating system, said nozzles including peripherally disposed aperture means directed parallel to the inner surface of said side walls to discharge water in a fan shaped stream generally downwardly along the inner surface of said side walls in a continuous path along the inner surface of said side walls toward and over said cove and laterally along the upper surface of said bottom wall toward said sump, and a plurality of relatively flat nozzles disposed on said bottom wall in surrounding relation to said sump for connection to the inlet of the circulating system, said last named nozzles including peripherally disposed aperture means directed parallel to the upper surface of said bottom wall generally toward said sump to direct water in a fan shaped stream toward said sump for maintaining said side walls and bottom wall substantially free of foreign debris and insuring that the foreign debris is expeditiously urged toward and scavenged by said sump, all of said nozzles being imperforated on the sides thereof remote from said apertures producing said fan shaped streams.

2. The structure of claim 1 wherein said aperture means of said nozzles comprises a plurality of radially directed openings.

3. The structure of claim 1 including a plurality of inlet jets in said side walls above said nozzles and directed laterally of said side walls, and water-aerating means connected to said nozzles and jets to distribute an effervescent mixture of water and air into said pool.

4. The structure of claim 1 wherein said pool is rectangular, said nozzles being disposed uniformly on said side and bottom walls for insuring scouring substantially all surface portions of said walls disposed in the direction toward which said aperture means are directed.

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