Jan. 30, 1962 R. L. READ 3,018,491

WATER CIRCULATING SYSTEM FOR CLEANING SWIMMING POOLS

Filed Sept. 1, 1959

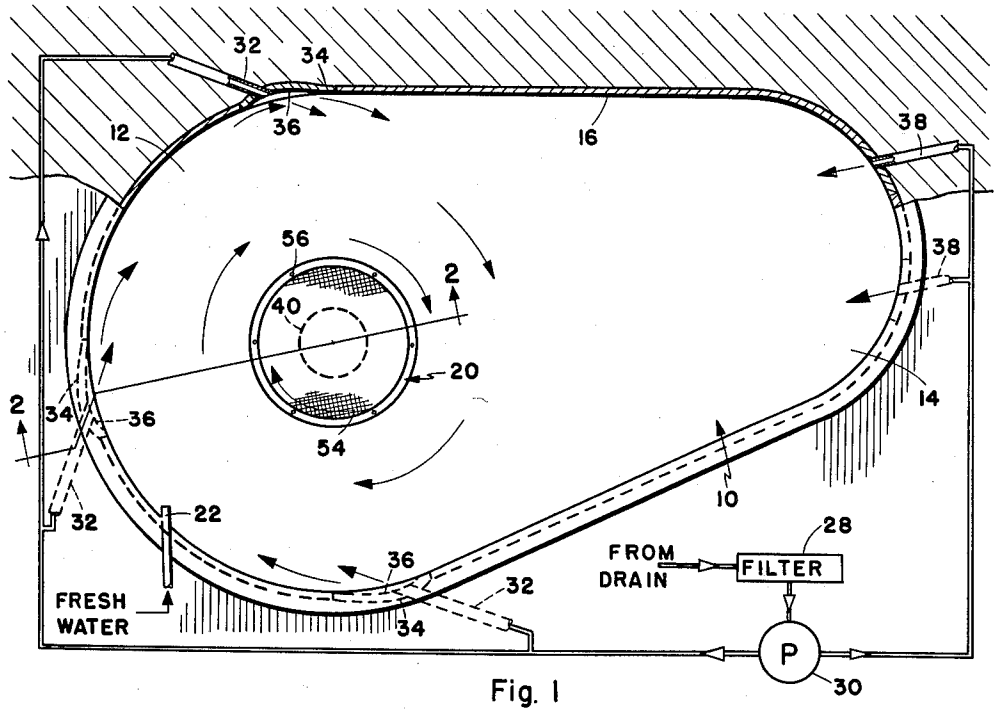


Fig. 1

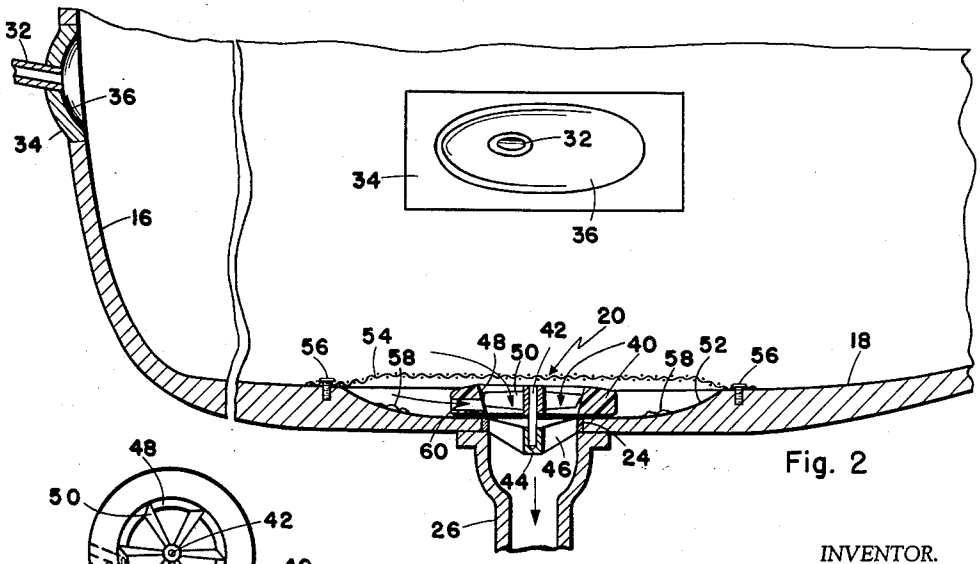


Fig. 2

Fig. 3

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United States Patent Office 3,018,491 Patented Jan. 30, 1962

3,018,491
WATER CIRCULATING SYSTEM FOR CLEANING SWIMMING POOLS

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Filed Sept. 1, 1959, Ser. No. 837,398
7 Claims. (Cl. 4—172)

The present invention relates generally to swimming pools and more particularly to a water circulating system for cleaning swimming pools.

The primary object of this invention is to provide a water circulating system for a swimming pool which causes a rotary motion of the water about the drain and includes means for bringing the water from other parts of the pool into the area of rotary motion.

Another object of this invention is to provide a water circulating system including an impeller driven rotating scoop in the drain which sweeps the area in the vicinity of the drain and prevents the accumulation of debris around the drain.

Still another object of this invention is to provide a water circulating system in which the various elements are incorporated into small panel units and can be built into many different types and shapes of pools.

A further object of this invention is to provide a water circulating system in which the elements are substantially flush with the pool structure to avoid interference with swimmers.

Finally, it is an object to provide a water circulating system of the aforementioned character which is simple, safe and convenient to install and operate and which will give generally efficient and durable service.

With these and other objects definitely in view, this invention consists in the novel construction, combination and arrangement of elements and portions, as will be hereinafter fully described in the specification, particularly pointed out in the claims, and illustrated in the drawing which forms a material part of this disclosure, and in which:

FIGURE 1 is a top plan view, partially cut away, of a pool incorporating the water circulating system;

FIGURE 2 is an enlarged fragmentary sectional view taken on the line 2—2 of FIGURE 1; and

FIGURE 3 is a top plan view of the rotary scoop.

Similar characters of reference indicate similar or identical elements and portions throughout the specification and throughout the views of the drawing.

The swimming pool **10** is of conventional type having a deep end **12** and a shallow end **14**, the excavation being lined by a side wall **16** and a floor **18**. The pool may be of virtually any size and shape and lined with any suitable material such as concrete, block, tile, plastic, or the like, the particular construction being unimportant. In the deep end **12**, preferably at the lowest portion thereof, is a drain assembly **20** inset in the floor **18** in an opening **24** provided therein, the drain assembly being connected to a conventional drain pipe **26** leading to a conventional swimming pool plumbing system with recirculating pump, heater, drain connection and the like. For purposes of illustration a simple system is shown diagrammatically in FIGURE 1, in which the water from the drain is drawn through a filter **28** and recirculated by a pump **30**.

In the wall **16** around the deep end **12** are several primary inlet pipes, usually including an inlet pipe **22** for fresh replenishment and the inlet pipes **32** for recirculated water, these primary inlet pipes being downwardly inclined and vertically staggered in an interrupted spiral pattern leading downwardly toward said drain assembly **20**, said primary inlet pipes being disposed and positioned so that the influx of water therethrough causes a downwardly spiraling circulation of the water in the deep end

of the pool. In other words, the primary inlet pipes **32**, and preferably the fresh water inlet **22** as well, are arranged to create a vortex substantially centered on the drain assembly **20**, as indicated by the directional arrows in FIGURE 1. Each primary inlet pipe **32** is mounted in a panel **34** which can be fitted into the wall **16** as a part of the wall, each panel having a concavity **36** surrounding the inlet pipe, so that the water tends to flow into the concavity and add to the effectiveness of the current from the inlet pipe by initiating the flow directly from the surface of the wall **16**. The primary inlet pipes **32** are all connected to the recirculating pump **30** and return filtered water to the pool.

At the shallow end **14** are further or secondary inlet pipes **38**, two being illustrated as an example, although any number can be used. The secondary inlet pipes **38** are in the wall **16** and are directed toward the deep end **12** to cause a bottom flow of water from the shallow end to the deep end, said secondary inlet pipes also being connected to the pump **30**. The secondary inlet pipes **38** may also be in the upper one-half portion of the wall and directed slightly downwardly, although this is not essential. In swimming pools of free form or complex shapes, the various inlet pipes may be arranged as needed to create a vortex around the drain and to bring water from radiating branch-like parts of the pool into the area of the vortex.

It is important to note that by using this arrangement, the rotating current is concentrated in the critical part of the pool rather than attempting to circulate the entire body of water, so obtaining a greater effect with a minimum of water pressure from the inlets, the non-rotating portion of the water being caused to drift or flow into the rotational area, so that all of the water is eventually recirculated.

For additional cleaning action the drain assembly **20** is fitted with a rotor **40** having a vertical axial shaft **42**, which is freely rotatable in a bearing **44** supported inside the opening **24** by a spider **46**, or the like. The rotor **40** has a central aperture **48** in which are a plurality of radially extending blades **50**, said aperture corresponding generally in size to the opening **24**. The blades **50** are shaped so that the efflux of water through the drain pipe **26** causes the rotor **40** to rotate on its axis. The floor **18** has a shallow dish **52** formed therein in which the rotor **40** is substantially recessed, said dish being enclosed by a cover screen **54** of open mesh which is attached to the floor **18** by any suitable means such as screws **56** or clamps. The cover screen **54** is merely to protect swimmers from the spinning rotor **40** and is not primarily intended to retain debris carried in the water.

In most pools, a ring of debris is deposited around the drain due to the relatively still layer of water adjacent the pool floor in the vicinity of the drain. This ring of debris can form even with some swirling action of the water. In a conventional pool, the debris would normally settle in an area corresponding to the location indicated at **58**, within the dish **52**. To remove this debris, the rotor **40** is provided with a scoop channel **60** angularly disposed between the periphery of the rotor and the aperture **48**, so that the rotation of the rotor causes a sweeping action or influx of water into the scoop channel. Since this scooping action takes place adjacent the surface of the dish **52**, the resultant motion of the water prevents accumulation of debris, which is carried through the scoop channel **60** and into the drain pipe **26**. The surface of the dish **52** is preferably polished or similarly treated to produce a smooth surface which discourages adherence of debris. Thus the swirling action of the water brings all of the debris in the pool to the drain and the scooping action of the rotor **40** picks up any residue not carried directly into the drain, the debris

being extracted from the water by the conventional filter **28**.

In this manner, the pool is kept considerably cleaner than by the usual simple recirculation system and even cleaner than is possible with the swirling water action alone. The rotor **40**, however, is driven by the efflux of water and no power driven means is required other than the conventional pump **30**.

The operation of this invention will be clearly comprehended from a consideration of the foregoing description of the mechanical details thereof, taken in connection with the drawing and the above recited objects. It will be obvious that all said objects are amply achieved by this invention. It is noteworthy that any surface skimmers provided will be more effective when employed in conjunction with my above disclosed system, in addition to the improved self-cleaning characteristics and improved dissemination of chemicals added to the water.

It is understood that minor variation from the form of the invention disclosed herein may be made without departure from the spirit and scope of the invention, and that the specification and drawing are to be considered as merely illustrative rather than limiting. For example, the pool wherewith this invention is incorporated may be of virtually any desired shape and certain of the described elements of the invention may be omitted or duplicated. By way of further example, the rotor **40** may be power driven, at the option of the user, by an electric motor or otherwise, and used during flushing operations to create an increased suction and augmented outflow rate, thus further enhancing the self-cleaning characteristics of the pool.

I claim:

1. In a swimming pool having a side wall and a floor: a drain in said floor at substantially the deepest portion of the pool; means for causing the water in said swimming pool to assume a vertically downwardly spiraling circulation that takes the form of a vortex substantially centered on said drain, said means comprising a plurality of primary inlet pipes disposed in said wall around said drain and connected to a source of water; said primary inlet pipes being downwardly inclined and vertically staggered in an interrupted spiral pattern leading downwardly toward said floor, said inlet pipes directing incoming water into the pool in corresponding directions and causing a generally downwardly spiralling flow toward said drain, each inlet pipe discharging inwardly of the pool at an acute angle with reference to an adjacent wall surface portion of the pool.

2. In a swimming pool having a side wall and a floor: a drain in said floor at substantially the deepest portion of the pool; means for causing the water in said swimming pool to assume a vertically downwardly spiraling circulation that takes the form of a vortex substantially centered on said drain, said means comprising a plurality of primary inlet pipes disposed in said wall around said drain and connected to a source of water; said primary inlet pipes being downwardly inclined and vertically staggered in an interrupted spiral pattern leading downwardly toward said floor, said inlet pipes directing incoming water into the pool in corresponding directions and causing a generally downwardly spiralling flow toward said drain, each inlet pipe discharging inwardly of the pool at an acute angle with reference to an adjacent wall surface portion of the pool; a rotor having inclined blades and operably mounted in said drain; to rotate as water is exhausted through said drain; said rotor having a generally radially apertured portion defining a scoop channel leading from the periphery of the rotor inwardly into said drain; said scoop channel engendering a temporally localized, generally radial flow sweeping the area of floor adjacent said drain.

3. In a swimming pool having a side wall and a floor: a drain in said floor at substantially the deepest portion of the pool; means for causing the water in said swimming pool to assume a vertically downwardly spiraling circulation that takes the form of a vortex substantially centered on said drain, said means comprising a plurality of primary inlet pipes disposed in said wall around said drain and connected to a source of water; said primary inlet pipes being downwardly inclined and vertically staggered in an interrupted spiral pattern leading downwardly toward said floor, said inlet pipes directing incoming water into the pool in corresponding directions and causing a generally downwardly spiralling flow toward said drain, each inlet pipe discharging inwardly of the pool at an acute angle with reference to an adjacent wall surface portion of the pool; at least one secondary inlet pipe in said wall remote from said primary inlet pipes and directed toward that portion of the pool containing said drain; a rotor freely rotatably mounted in said drain; means for causing the efflux of water through said drain to cause rotation of the rotor, said means comprising inclined blades mounted in said rotor; and a scoop carried by said rotor to sweep the area of the floor adjacent said drain.

4. In a swimming pool having a side wall and a floor: a drain in said floor at substantially the deepest portion of the pool; means for causing the water in said swimming pool to assume a vertically downwardly spiraling circulation that takes the form of a vortex substantially centered on said drain, said means comprising a plurality of primary inlet pipes disposed in said wall around said drain and connected to a source of water; said primary inlet pipes being downwardly inclined and vertically staggered in an interrupted spiral pattern leading downwardly toward said floor, said inlet pipes directing incoming water into the pool in corresponding directions and causing a generally downwardly spiralling flow toward said drain, each inlet pipe discharging inwardly of the pool at an acute angle with reference to an adjacent wall surface portion of the pool; and at least one secondary inlet pipe in said wall remote from said primary inlet pipes; said secondary inlet pipe being directed toward that portion of the pool containing said drain.

5. A swimming pool having a floor and a drain therein; a rotor freely rotatably mounted in said drain; means for causing the efflux of water through said drain to cause rotation of the rotor, said means comprising suitably shaped and inclined blades mounted on said rotor; and a scoop mounted on and carried by said rotor to sweep the area of the floor adjacent said drain.

6. In a swimming pool having a side wall and a floor: a drain in said floor at substantially the deepest portion of the pool; means for causing the water in said swimming pool to assume a vertically downwardly spiraling circulation that takes the form of a vortex substantially centered on said drain, said means comprising a plurality of primary inlet pipes disposed in said wall around said drain and connected to a source of water; said primary inlet pipes being downwardly inclined and vertically staggered in an interrupted spiral pattern leading downwardly toward said floor, said inlet pipes directing incoming water into the pool in corresponding directions and causing a generally downwardly spiralling flow toward said drain, each inlet pipe discharging inwardly of the pool at an acute angle with reference to an adjacent wall surface portion of the pool; and at least one secondary inlet pipe in said wall remote from said primary inlet pipes; said secondary inlet pipe being disposed to direct a flow of water toward that portion of the pool containing said drain; said floor having a dished portion surrounding said drain; a rotor freely rotatably mounted in said drain and substantially recessed in said dished portion; means for causing the efflux of water through said drain to cause rotation of the rotor, said means comprising suitably shaped and angled blades positioned in said rotor; and a scoop channel in said rotor and leading from the periph-

ery of said rotor into said drain, said scoop channel engendering a temporally localized, generally radial flow sweeping the area of floor adjacent said drain.

7. A swimming pool according to claim 1 wherein each of said primary inlet pipes is mounted in a panel constituting a portion of said wall; each panel having a concave portion surrounding the inlet pipe; and the end of each inlet pipe being recessed below the surface of said wall in the respective concave portion.

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