This invention relates generally to apparatus used in maintaining swimming pools and in particular to a unitary pump, filter, and skimmer for such pools. While filter-skimmer apparatus of the type are disclosed and claimed in my United States Patent 2,826,307, titled Fluid Recirculation Systems, has come into widespread use, the applications in which these are used conventionally require a separate mounting for the water-circulating pump. Depending upon the type of pump used, these often require pressure tanks, the pump and tank often being installed above ground so as to be accessible. If disposed near the pool, the pump and accompanying tank tend to give the pool area a cluttered appearance. If installed out of the pool area, the added plumbing expense can be substantial.

It is the primary object of the present invention, therefore, to provide a unitary pump and filter-skimmer which can be installed below ground level at pool side in a single housing.

It is a further object of the present invention to provide a unitary pump and filter-skimmer in which a submerged motor and pump are utilized, the noise of operation of the pump and motor being thereby muffled and pump priming and packing difficulties being thereby eliminated.

A further object of the present invention is to provide a submerged pump and motor subassembly utilizing a unitary pump and filter-skimmer assembly utilizing a subassembly being conveniently removable for inspection or repair.

A further object of the present invention is to provide a unitary pump and filter-skimmer apparatus which can be installed with a minimum of plumbing expense.

These and other objects will become apparent as the description proceeds with reference to the accompanying drawings of:

Fig. 1 is a sectional side view of an apparatus embodying the present invention.

Fig. 2 is a perspective, cutaway view of the apparatus of Fig. 1.

Fig. 3 is a schematic view of the apparatus installed at a swimming pool.

Referring initially to Figs. 1 and 2, there is shown at 19 a generally cylindrical filter tank having a closed lower end 20 and an open upper end which accommodates the removable closure plate 21. The tank is provided with an inlet neck 22, which projects laterally from the tank near its upper end. The tank is installed adjacent the side 24 of a swimming pool with its upper end at ground level and with the pool coping 25 overlying the inlet neck. The inlet neck provides a passageway through which water may flow from the pool into the tank.

Within the inlet neck a buoyant weir 26 is pivotally mounted and serves to admit floating debris to the tank but prevents its return to the pool. The structure and operation of the weir is disclosed in detail in Patent 2,826,307, mentioned supra. Just below the inlet neck the interior of the tank is provided with an annular abutment or flange 18, which supports a perforated leaf basket 19.

A second annular abutment or flange 21 supports a plate 22, which extends transversely across the tank. The plate supports a pump 23, having an inlet fitting 24 whose center coincides with the axial center line of the tank. The pump inlet fitting receives the lower end 26 of a filter structure which includes a central tube 27 provided with a handle 25 and communicating with the interior of multiple filter elements 28. The filter elements may take the form of substantially disc-like, hollow members formed of a screen covered by a fabric envelope. One type of filter structure usable in the apparatus of the present invention is disclosed in detail in the aforementioned Patent 2,826,307. It will be evident that other types of filter structures might also be utilized, the functional requirement being that they communicate with the inlet passage to the pump.

The pump is driven by a submersible motor 29 supported beneath the pump by the plate 22. Wiring 31 for the motor extends exteriorly of the tank through a conduit 32 and may be connected to a remote switch and to a suitable source of electrical power. A flexible conduit coupling 33 connects the pump discharge to a pool return line 34, and a vacuum line 36, threaded into a flange on the tank, communicates with the interior of the tank.

As may be seen in Fig. 3, the tank 10 is installed at poolside with the vacuum line 36 extending through the side of the pool and provided with a fitting (not shown) which permits the attachment of a vacuum pool cleaning device thereon. The pump discharge line 34 is connected to a manually operated three-way valve 37. One valve passage is connected to the pipe 38, which returns water both to the surface of the pool by means of pipe 39 and to the floor of the pool by means of pipe 41. The other valve passage is connected to a waste pipe 42. The valve 37 and an electrical switch (not shown) controlling the pump motor may be housed in a deck box, as indicated by broken lines at 43. The deck box may be installed so that it has a removable lid at ground level which permits access to the valve and switch.

In operation, with the valve 37 positioned so that communication is established between the pipes 34 and 38, water will be drawn from the pool through the inlet neck 13 and into the tank. After flowing through the filter structure, water will be discharged by the pump through the discharge line 34 and returned to the pool. During this circulation of the water, the leaf basket 19 will retain debris of a relatively large size and the filter structure will remove finer particles from the water. Should it be desired to clean the pool through the vacuum line 36, the leaf basket and filter structure may be removed from the tank and a vacuum lid (not shown) placed over the annular flange 18 sealing the lower portion of the tank against the entry of water from the pool. Under these conditions it will be evident that water will be drawn from the pool through the vacuum connection and into the tank. The pump will discharge this water through the line 34 and will discharge it through the waste line 42, assuming that the valve 43 has been manipulated so that communication is established between pipe 34 and waste line 42.

It will be noted that the pump and its drive motor operate submerged, thereby eliminating overheating, priming and packing problems and providing a muffling of the noise of operating of the pump and the motor. Since the tank houses the skimmer, filter structure, pump and drive motor, the unitary assembly is installed in one operation with a minimum of plumbing required.

The arrangement of the pump and motor within the tank permits its convenient removal therefrom for inspec-
tion or maintenance. This may be accomplished by first removing the leaf basket and filter structure from the upper end of the tank. The quick-disconnect coupling 33 may then be disengaged from the pump and the plate 22, together with the pump and motor may be lifted from the tank.

While the invention has been disclosed and described in some detail in the drawings and foregoing description, they are to be considered as illustrative in character, as other modifications readily suggest themselves to persons skilled in this art and within the broad scope of the invention, reference being had to the appended claims.

The invention claimed is:

1. A unitary pump and filter-skimmer assembly for swimming pools comprising, a cylindrical skimmer tank having a closed bottom and adapted to be mounted in axially erect position adjacent the pool with its upper end extending above the normal water level in the pool, an inlet neck projecting laterally from said tank near the upper end thereof, a buoyant weir pivotally mounted in said neck to admit floating debris to the tank and preclude its return to the pool, abutments extending from the inner face of said tank side wall intermediate the ends of the tank, a plate supported by said abutments, a pump having an inlet passage and an outlet passage mounted on said plate with the center of its inlet passage coinciding with the axial center line of said tank, a filter structure removably supported above said pump and communicating with said inlet passage, a submersible motor adapted to drive said pump and supported by said plate below the pump, and a conduit having a quick disconnect coupling to said pump discharge passage and extending exteriorly of said tank to provide a return line, removal of said filter from said tank and disconnection of said coupling permitting removal of said plate and consequently said pump and motor from said tank.

2. A unitary pump and filter-skimmer assembly for swimming pools comprising, a cylindrical skimmer tank having a closed bottom and adapted to be mounted in axially erect position adjacent the pool with its upper end extending above the normal water level in the pool, an inlet neck projecting laterally from said tank near the upper end thereof, a buoyant weir pivotally mounted in said neck to admit floating debris to the tank and preclude its return to the pool, abutments extending from the inner face of said tank side wall intermediate the ends of the tank, a plate supported by said abutments, a pump having an inlet passage and an outlet passage mounted on said plate with the center of its inlet passage coinciding with the axial center line of said tank, a filter structure removably supported above said pump and communicating with said inlet passage, and a submersible motor adapted to drive said pump and supported by said plate below the pump, removal of said filter permitting removal of said plate and consequently said pump and motor from the upper end of said tank.

3. A unitary pump and filter-skimmer assembly for swimming pools comprising, a generally cylindrical skimmer tank adapted to be mounted in axially erect position adjacent the pool with its upper end extending above the normal water level in the pool, an inlet neck projecting laterally from said tank near the upper end thereof, means mounted in said neck to admit floating debris to the tank and preclude its return to the pool, abutments extending from the inner face of said tank side wall intermediate the ends of the tank, an element supported by said abutments and extending transversely across said tank, a pump having an inlet passage and an outlet passage mounted on said element with the center of its inlet passage coinciding with the axial center line of said tank, a filter structure removably supported above said pump and communicating with said inlet passage, and a submersible motor adapted to drive said pump and supported by said element below the pump, removal of said filter permitting removal of said plate and consequently said pump and motor from the upper end of said tank.

4. A unitary pump and filter-skimmer assembly for swimming pools comprising a generally cylindrical skimmer tank adapted to be mounted in axially erect position adjacent the pool with its upper end extending above the normal water level in the pool, an inlet neck projecting laterally from said tank near the upper end thereof, means mounted in said neck to admit floating debris to the tank and preclude its return to the pool, abutments extending from the inner face of said tank side wall intermediate the ends of the tank, an element supported by said abutments and extending transversely across said tank, a pump having an inlet passage and an outlet passage mounted on said element, a filter structure removably supported above said pump and communicating with said inlet passage, and a submersible motor adapted to drive said pump and supported by said element below the pump, removal of said filter permitting removal of said plate and consequently said pump and motor from the upper end of said tank.

5. A unitary pump and filter-skimmer assembly for swimming pools comprising, a generally cylindrical skimmer tank adapted to be mounted in axially erect position adjacent the pool with its upper end extending above the normal water level in the pool, an inlet neck projecting laterally from said tank and adapted to admit water from the pool into said tank, skimming means mounted in said neck to admit floating debris to the tank and preclude its return to the pool, a pump having an inlet and a discharge passage supported in said tank below the normal water level therein, said pump discharge passage being connected to a pool return line, said pump inlet passage communicating through a filter structure with the interior of said tank, and a submersible pump-driving motor mounted adjacent said pump, operation of said pump serving to circulate water from the pool through said tank and return filtered water to the pool.

References Cited in the file of this patent

UNITED STATES PATENTS

2,419,146 Kimm et al. Apr. 15, 1947
2,826,307 Pace Mar. 11, 1958