Nov. 11, 1952 C. HAUBER ET AL 2,617,764

SWIMMING POOL

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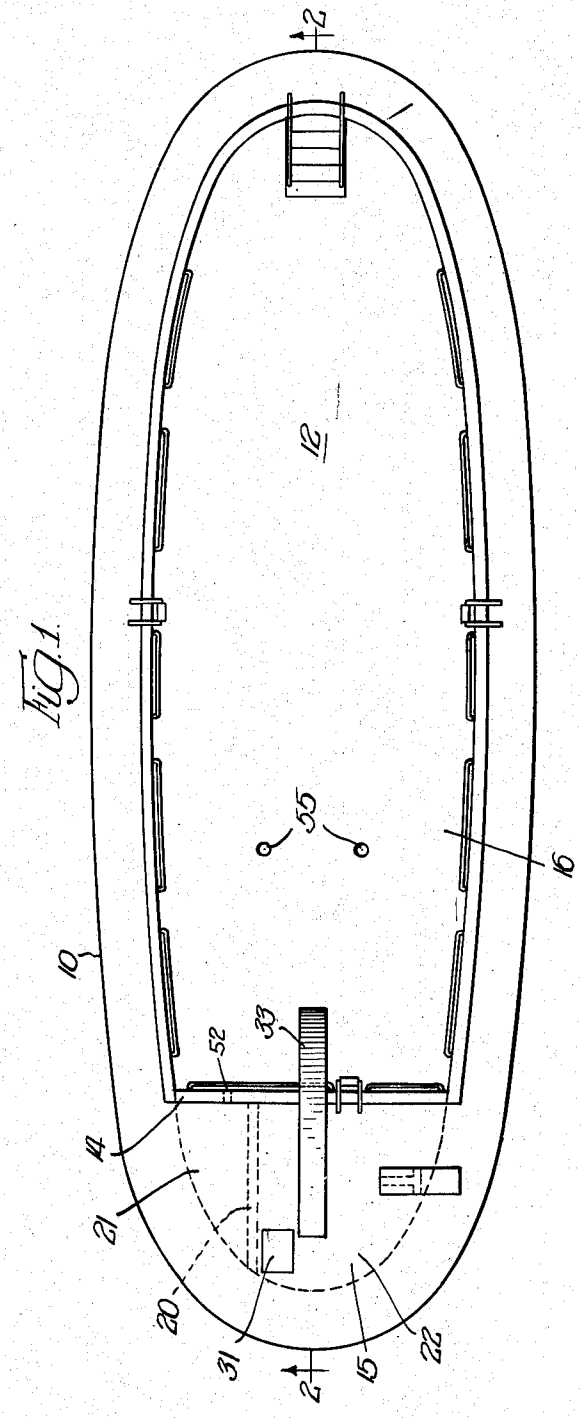


Fig. 1.

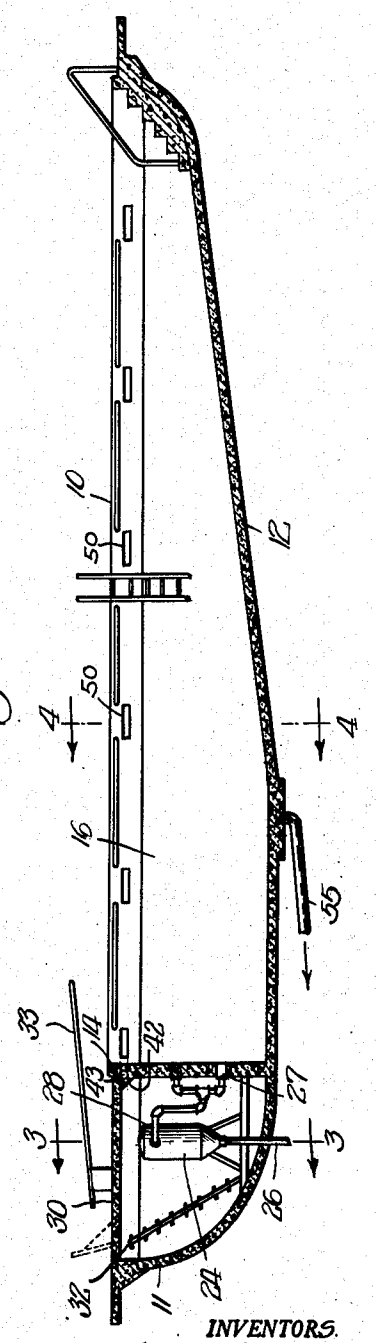


Fig. 2.

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Fig. 3

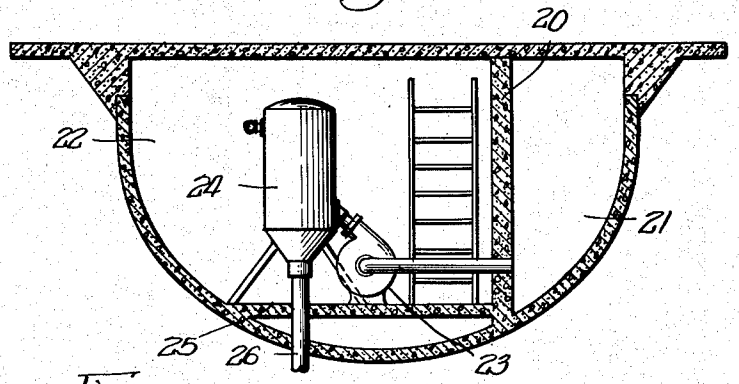


Fig. 4

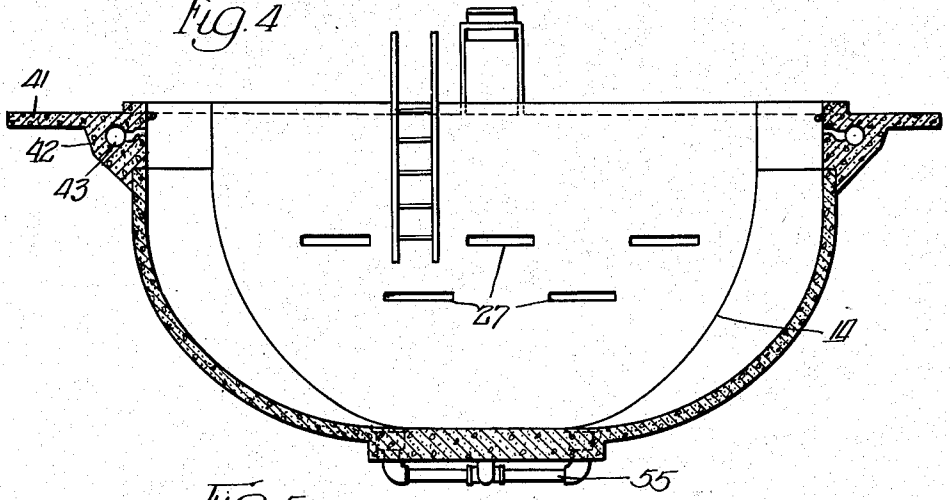
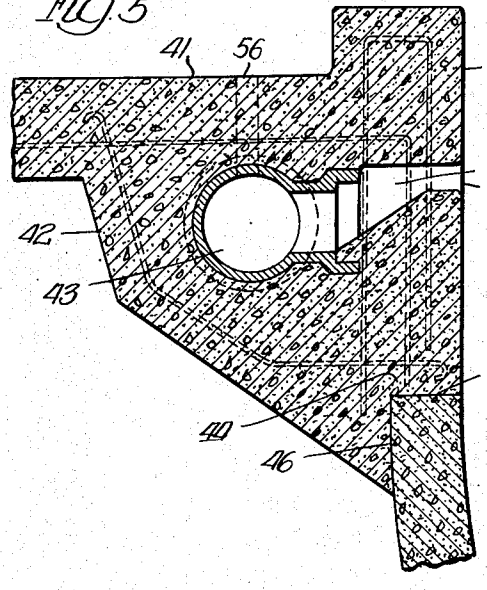


Fig. 5



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Fig. 6

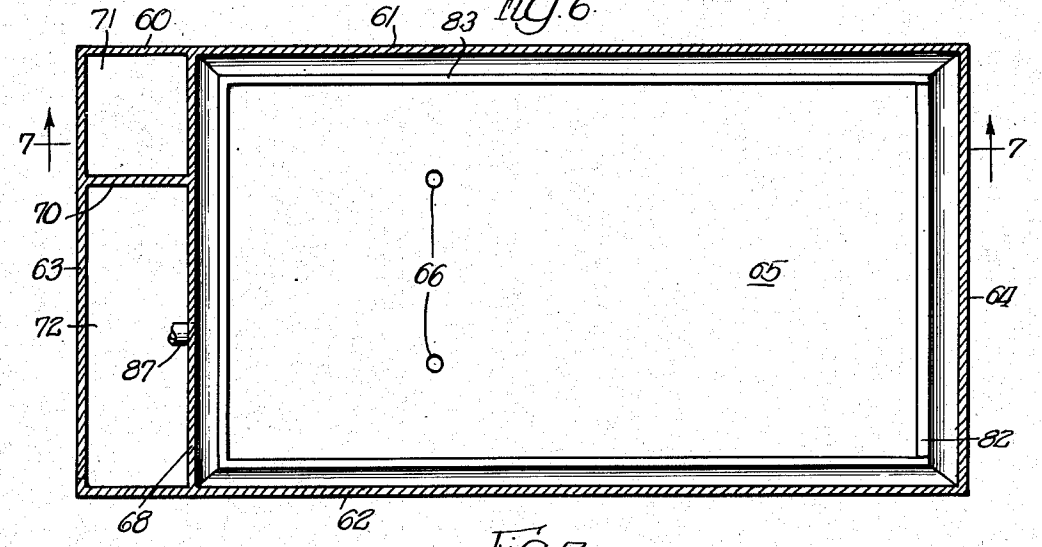


Fig. 7

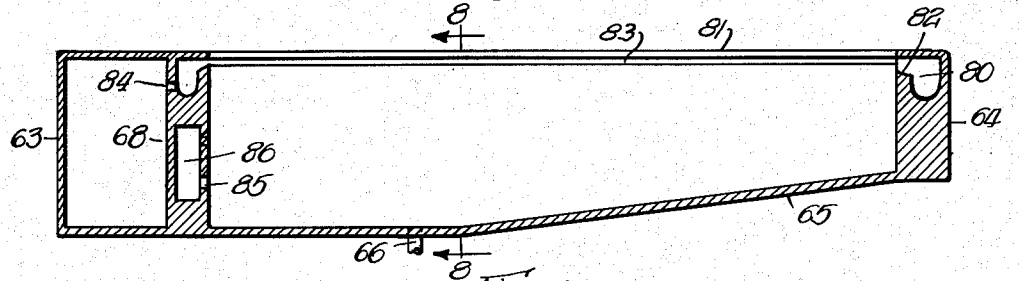
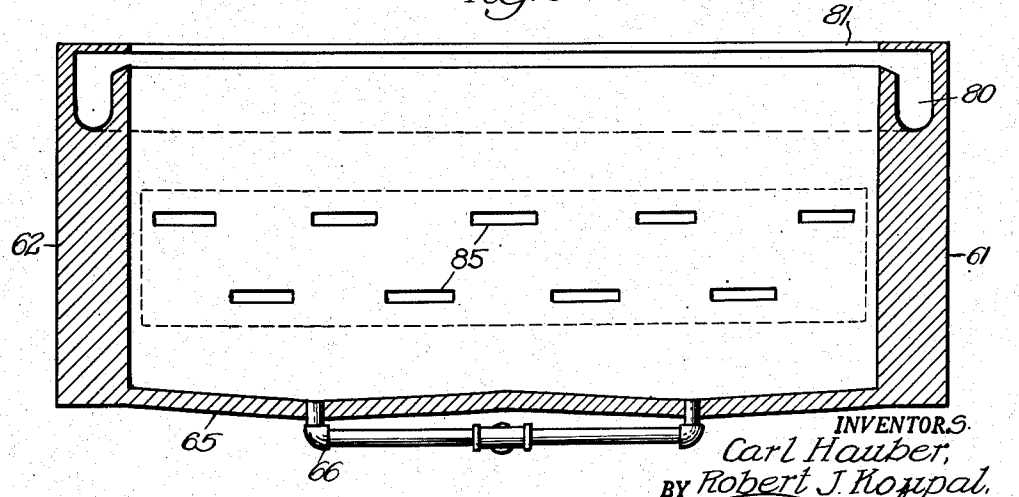


Fig. 8



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Patented Nov. 11, 1952

2,617,764

UNITED STATES PATENT OFFICE

2,617,764

SWIMMING POOL

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Application February 19, 1947, Serial No. 729,660

8 Claims. (Cl. 210—11)

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This invention relates to swimming pools.

It is an object of this invention to provide a swimming pool that is compact and cheap in construction.

Another object is to provide a swimming pool and recirculation system therefor that needs no extraneous piping for conducting the water from the pool to the filter and thence back to the pool.

Another object is to provide a swimming pool recirculation system installed within the pool structure.

Another object of our invention is a swimming pool that need not be anchored in the ground below the freezing line but can be permitted to be raised by outside pressures, such as occur, for instance, upon freezing of the soil.

Another object of the invention is to eliminate stresses between the pool and its filter chamber due to unequal settling of the ground.

Another object is to provide a swimming pool recirculation system which prevents short circuiting of the filtered water to the recirculation conduit.

Still another object is to provide a swimming pool recirculation system wherein the recirculated water is withdrawn from the surface layers of the pool water.

Another object is a combined recirculation conduit and splash gutter for a swimming pool.

Swimming pools are commonly constructed from concrete with vertical walls and a bottom that is substantially at right angles to the boundary walls and slopes slightly downwardly to one or several drains located in the bottom, usually somewhere near one end of the pool. The equipment for the filter and recirculation system is generally located in a separate chamber adjacent or near the pool and is connected to the pool by suitable inlet and outlet piping. Usually the inlet piping of the filter system is connected to the bottom drain and receives the pool water therethrough, the drain serving both for recirculation and, through a waste connection, for draining the pool. The pool is usually surrounded by a scum and splash gutter which is also connected to the inlet piping of the recirculation system.

Such construction of swimming pools is very expensive. The vertical walls of the pool must be poured of concrete and strongly reinforced as they have to withstand considerable pressures when the pool is empty. In view of the external piping between the pool and the filter system floating of the pool must be prevented. Excavation has therefore to be carried usually to a considerable depth to permit firmly anchoring

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the pool below the freezing line of the ground. In spite of all precautions and the great expense involved there remains still the danger that the pool will float when pressures exceed the foreseen limit for some reason. When this occurs, or when the ground settles unequally under the pool and the filter chamber, the extraneous pipe system connecting the pool with the filter system will be disrupted, necessitating cumbersome and expensive repairs.

Another disadvantage of the conventional construction is that drawing off from one or several bottom drains is conducive to considerable short circuiting of the filtered water from the inlet to the drain. Further, in such a construction, the bottom layers of the pool water are withdrawn while the upper layers of water, which carry most of the contaminating materials, may remain undisturbed in the pool for substantial periods.

We have found that these drawbacks can be avoided and the construction cost be cut down considerably by using the improved construction of our invention.

Briefly, we propose to place the filter chamber into the basin proper and to eliminate all external piping to and from the filter chamber, substituting therefor flow channels formed in and through the walls of the basin. We thus provide a very compact structure with considerable saving in space and construction cost. We also propose to withdraw the water from the pool for filtering in a manner which prevents short circuiting of the filtered water to the take off and provides even distribution of withdrawal, and whereby the upper layers of water are withdrawn rather than the lower ones. This result is obtained by providing a launder or recirculation conduit leading around the basin and discharging into a pump well in one end of the basin adjacent the filter chamber. Water may be withdrawn into the conduit through a plurality of ports in the wall of the conduit which are equally spaced around the basin at the predetermined liquid level, or we may provide a weir at the end of the pool opposite the inlet for filtered water over which the water flows into the recirculation conduit. In any event, short circuiting is prevented and the surface water is withdrawn uniformly. The recirculation conduit may also serve at the same time as splash gutter by providing an overflow thereinto above the normal liquid level in the basin.

Instead of the vertical walls and horizontal bottom commonly used we may also provide in some cases, especially for smaller pools, a sub-

stantially oval basin with a boundary wall that slopes from all sides gently down to and merges with the rounded floor of the basin. This construction has great advantages. The rounded oval shell of the basin is very well suited to take considerable pressures and when exposed to unexpected stress it will not break but may be somewhat compressed and slightly lifted. In the absence of external piping that could be disrupted, such floating or lifting of the pool will cause no damage and is not objectionable. It is therefore not necessary to anchor the pool in deep ground but the pool will be allowed to float. Consequently much less excavation is needed than with the conventional construction. In view of the favorable shape with regard to stresses the walls of the oval basin can be considerably lighter. They need not be poured of concrete and need not be reinforced, but can be made by spraying cement directly on the ground.

Our invention will be readily understood from a consideration of the drawings which form a part hereof and wherein:

Figure 1 is a plan view of one embodiment of a pool of our invention.

Figure 2 is a vertical longitudinal section of the pool of Figure 1 taken along the line 2—2 of Figure 1.

Figures 3 and 4 are vertical cross sectional views, on an enlarged scale, of the pool taken along lines 3—3 and 4—4 of Figure 2, respectively.

Figure 5 is an enlarged cross sectional view of the overflow drain of Figure 4.

Figure 6 is a plan view of another embodiment of our invention with the cover of the recirculation conduit and filter chamber and the filtering equipment removed.

Figure 7 is a vertical longitudinal sectional view of the embodiment of Figure 6 with the equipment removed taken along line 7—7 of Figure 6; and

Figure 8 is a vertical transverse sectional view, on an enlarged scale, of the pool of Figure 6 taken along the line 8—8 of Figure 7.

The swimming pool of Figures 1 to 5 comprises a basin 10 having an elliptical boundary wall 11 sloping down from all sides toward and merging with a rounded bottom 12. As shown in Figure 2, the slope of the wall 11 and floor 12 may be somewhat steeper on one end portion of the basin and more gentle on the other end portion. This oval shell or basin 10 may be constructed by spraying cement on the excavated ground. It will be obvious that the shape of the basin requires only machine excavation and avoids the use of much of the forms heretofore required.

A partition 14 is mounted across the full width of the basin 10 near the deep end thereof and extends from the floor 12 to an elevation above the predetermined liquid level therein, thus separating the end portion 15 of the basin from the main portion 16 or pool proper. As best shown in Figure 3, the end portion 15 is divided by a second partition 20, which is at right angles to the partition 14, into two laterally adjacent chambers, 21 and 22. Into the larger chamber 22 we place the filtering and recirculation equipment, such as a recirculation pump 23 and a filter 24 which may be a sand filter or a diatomite filter. A floor 25 may be provided in the filter chamber 22 to support the equipment. The smaller chamber 21 serves as a pump well and replaces the usual surge tank. Raw water may be admitted to the pump well by any suitable means, not shown. As shown in Figure 3, the pump suction line extends from the filter chamber 22 through the partition 20 into the pump well 21. A wash water drain conduit 26 leads from the filter 24. Filtered water reenters the pool through inlet fittings 27 which are cast in the partition wall 14 and connected to the filter outlet conduit 28. The end portion 15 of the basin, containing the two chambers 21 and 22, is preferably provided with a cover 30 as shown in Figure 2. A manhole 31 and ladder 32 provide access to the filter chamber 22. The cover 30 may be used to support a diving board 33 which will extend beyond the partition 14 and thus over the deepest portion of the pool.

A recirculation conduit 40 surrounds the upper wall portion of the pool proper, including the partition wall 14. This recirculation conduit will be poured from concrete and reinforced. It may take the form shown in Figures 4 and 5 and comprise an upper horizontally extending curb portion 41 which may merge into a walkway, not shown, leading around the basin 10, and a wedge shaped lower portion 42 in which the recirculation channel 43 is formed. The lower inner portion of the wedge is cut away, as shown at 44, to provide edges 45 and 46 which conform to the shape of the wall 11. Thus the wedge rides on the upper edge of wall 11 and will be supported thereon by the usual earth fill around the basin, not shown.

As shown in Figure 2, a plurality of equally spaced ports 50 are provided in the inner wall of the recirculation conduit. These ports should be at an elevation adjacent the predetermined liquid level in the basin so that they form overflows. Bores 51 lead from the ports 50 and communicate with the channel 43. The channel 43 should be of sufficient size to hold the recirculation flow from the pool to the filter and the ports be so proportioned that the water is uniformly withdrawn through all of them. The channel 43 has a light slope downwardly from the shallow end portion of the basin 10 to the partition wall 14 so that the water flows by gravity along the channel, and drains into the pump well 21 through an outlet port, or ports 52. Bottom drains 55, which will be provided with suitable plugs, not shown, lead from the deep portion of the pool, as shown. These drains are used only when the water in the pool is to be removed to waste. The withdrawal of pool water to the filter is effected solely by way of the channel 43.

The operation of the pool and its recirculation system will be easily understood. Assuming the pool has been emptied for cleaning and is ready to be refilled, drains 55 having been closed and the raw water inlet means opened: then the pump 23 is started and water is pumped from pump well 21 into and through the filter 24 and discharged through inlets 27 into the main portion 16 or the pool proper. When the pool is filled to the predetermined level the raw water inlet means will be closed. Water from the pool will now begin to flow through ports 50 and channel 43 into the pump well 21. As pumping is continued pool water will circulate from the pool through the channel 43, the outlets 52, the pump well 21, the filter 24 and back to the pool through inlets 27. Backwashing of the filter is effected in usual manner and wash water is discharged to waste through the drain 26.

It will be obvious from the description that our construction avoids all extraneous piping in the recirculation system which might be damaged by

floating of the pool. At the same time our pool has the advantage that short circuiting of filtered water from the inlet to the recirculation conduit is minimized by withdrawing the pool water at multiple points evenly spaced around the pool. This provides a much better distribution than the usual withdrawal from one location within the pool, as through a bottom drain. A further advantage resides in the withdrawal for filtering of the upper layers of water rather than the bottom layers. Floating matter is most objectionable and gives a pool a very unpleasant appearance. The usual acum gutter which receives only such surface water as spills over occasionally, is not effective to remove floating materials such as hair, lint and grease, which appear in great quantities on the pool where control of the bathers is not quite strict. Frequently, it is necessary to raise the level of a pool to skim these floating materials into the scum gutters. While we may provide overflow openings in the curb portion of the recirculation conduit, such as shown at **56** in Figure 5, to avoid flooding of the walkway, we need not rely on these for removal of the surface layers of the pool water with their floating materials, as these are continuously withdrawn through the ports **50** and passed to the filter.

The embodiment of Figures 6, 7, and 8 is quite similar to that described above and based on the same principles: i. e. the arrangement of the filter chamber and pump well within one end portion of the basin, elimination of all external piping between filter chamber and pool and substitution therefor of flow channels in and through the walls of the basin, withdrawal of the surface layers of water for filtering and preventing of short circuiting of filtered water.

In these figures the invention is shown for purposes of illustration as applied in a rectangular basin, although the oval shape of Figure 1 may also be used. This embodiment is especially suitable for large pools, such as municipal pools.

The basin **60** has side walls **61** and **62** and end walls **63** and **64** which may be poured from concrete and reinforced in the usual manner. The bottom **65** may slope downwardly from end wall **64** to the location of drains **66** but may be substantially horizontal from the end wall **63** to the drains. The bottom may also slope slightly from the side walls and from the axis of the basin to the drains, as shown in Figure 8. A partition **68** is mounted laterally across the basin **60**, near the end wall **63**, and extends from the floor **65** to above the predetermined liquid level. A second partition **70** divides the space between partition **68** and end wall **63** into two chambers, **71** and **72**, which serve as pump well and filter chamber, respectively. This arrangement is the same as in the first embodiment and the equipment for the filter and recirculation system will be installed in the same manner and need not be described. The two chambers **71** and **72** preferably will also be covered, as shown in Figure 7. In this embodiment the launder **80** which serves as recirculation conduit is poured with the walls of the pool proper, including the partition, and integral therewith, as shown in Figures 7 and 8. A concrete cover **81** will be provided for the launder and will usually merge into a walkway around the basin, not shown. In this embodiment all water is taken off into the launder **80** over a weir **82** at the far end of the basin from the filter chamber. The weir **82** is a few inches lower than the inner wall of the launder along the other sides of the pool so that the water is forced to flow through the entire length of the pool before reaching the take off. As in the embodiment of Figure 1 the launder has a slight slope from the end wall **64** to the partition **68** so that water will flow by gravity to the pump well **71**.

The inner wall of the launder along the sides **61** and **62** of the basin and partition **68** may be provided with a plurality of ports, such as ports **50** of Figure 2, which will be arranged above the normal liquid level in the pool, or the upper edge of the inner wall may be slightly spaced below the cover **81** as shown in Figure 7 to provide an auxiliary overflow **83** into the launder, at an elevation above the liquid level as established by the weir **82**. This construction provides a splash gutter and recirculation conduit combined in one simple structure instead of the separate conduits usually provided therefor.

The launder **80** discharges into the pump well **71** through an outlet **84**. Filtered water is returned to the pool through fittings **85** cast in the partition **68** which provide even distribution over the entire width and depth of the pool. The fittings may be connected to the filter outlet conduit, as shown in Figure 2, or, as shown in Figure 7, a distribution flume **86** may be formed in partition **68** and the filtered water passed thereinto through an inlet **87** (Figure 6), to be discharged through the fittings **85**.

Due to the fact that the filtered water enters the pool at the deep end through submerged inlets and flows across the entire length of the pool to be withdrawn at the shallow end from the surface, a uniform distribution of the filtered water and withdrawal of the whole contents of the pool is assured and short circuiting from the inlet to the outlet prevented. The top layer of water which is continuously withdrawn over the weir carries with it the floating matter such as hair and lint, so that the surface of the pool is at all times clean.

It will be obvious from the description of the preferred embodiments of our invention that we provide a compact pool and recirculation unit which is not endangered by floating or settling of the ground and which is cheap in construction and simple in maintenance. Many modifications within the scope of the invention will occur to those skilled in the art. Accordingly we do not wish to limit ourselves to the exact construction of the embodiments shown which were described for purposes of illustration and exemplification but not of limitation.

We claim:

1. In a swimming pool including a basin and a water filtering plant, a recirculation system connecting said basin and said filtering plant, said recirculation system being free of external piping subject to disruption and comprising a partition within said basin near one end thereof and extending across the width of said basin from the bottom to an elevation above the predetermined liquid level of said basin, and separating the main portion of said basin from an internal chamber in one end portion of said basin, a second partition extending from said first partition and dividing said internal chamber into a pump well and a filter compartment, a substantially horizontal flow channel in the upper portion of the walls of said basin, an overflow into said channel from said basin determining the normal liquid level in said basin, and outlet from said channel into said pump well, an inlet into said filter compartment from said pump well adapted to be connected to the suction line of

a pump in the filter compartment, and an inlet into said main portion comprising a passageway leading from said filter compartment through said first partition, said inlet being adapted to be connected to the outlet conduit from a filter in said filter chamber.

2. The apparatus of claim 1, wherein said overflow comprises a weir at the end of said main portion opposite said inlet into said main portion.

3. The apparatus of claim 1, wherein said overflow provides a plurality of ports spaced around the main portion of said basin.

4. A swimming pool comprising a substantially oval basin having a rounded bottom and a boundary wall sloping downwardly to and merging into said bottom, a drain leading from said bottom to waste, a channel in the upper portion of said wall, said wall having a plurality of uniformly spaced ports connecting said channel with said basin and establishing the liquid level in said basin, a partition across said basin near one end thereof, a second partition leading from said first partition to said end of the basin, an outlet from said channel into the space on one side of said second partition, an inlet into said basin from the space on the other side of said second partition, said inlet leading through said first partition, and an outlet from said last mentioned space to waste, said second partition being provided with an opening.

5. In a swimming pool and recirculation system of the type described, including a basin having a bottom and a boundary wall, a pump, a filter having an inlet and an outlet, said filter inlet being connected to the discharge side of said pump, and an inlet for filtered water into said basin connected to the outlet of said filter, a unitary recirculation conduit and scum gutter structure comprising a substantially horizontally extending channel in the walls of said basin, an overflow into said channel from said basin determining the normal liquid level in said basin, an auxiliary overflow from said basin into said channel at an elevation higher than said first overflow, said channel discharging on the suction side of said pump.

6. A swimming pool including a basin, a filter plant, and a recirculation system conveying pool water to the filter and filtered water to the pool, said system being characterized by being free of external piping and being formed by a vertical partition in said basin separating one end portion of said basin from the main portion, thereby forming a chamber within said basin for housing said filter plant, a flume in said partition, a plurality of outlets leading from said flume to said main portion of the basin through said partition, an inlet into said flume from said chamber and adapted to receive filtered water from said filter plant, a launder around said main portion, an overflow into said launder, and an auxiliary overflow into said launder at an elevation higher than said overflow, said launder discharging into said chamber.

7. In a swimming pool including a basin having a bottom and boundary walls and a filtering plant, a recirculation system connecting said basin and filtering plant and being free of piping external of said basin, said system comprising a partition wall separating a chamber for the filter plant in an end portion of said basin from the main portion thereof, a second partition dividing said chamber into a pump well and a filter compartment, a launder around the main portion of said basin, said launder being formed in and integral with the upper part of the walls around said main portion, an outlet from said launder into said pump well, an outlet from said pump well into said filter compartment, a plurality of flow channels leading through said first partition from said filter compartment into said main portion, and a weir along the end wall in said main portion and forming an overflow into said launder, the elevation of said weir being lower than the elevation of the top of said launder.

8. In a swimming pool including a basin and a filter plant, a recirculation system free of external piping connecting said basin and said filter plant and comprising a vertical partition in said basin separating a chamber for said filter plant in one end portion of said basin from the main portion of the basin, a plurality of passageways leading through said partition to said main portion, said passageways being connected to a common inlet adapted to receive filtered water from said filter plant, a launder around said main portion, an overflow into said launder establishing the normal liquid level in said basin, an auxiliary overflow into said launder from an elevation higher than said first overflow, an outlet from said launder discharging into said chamber, a wall separating said launder outlet from said common inlet, and a passageway through said wall adapted to be connected to the pump suction line of said filter plant.

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