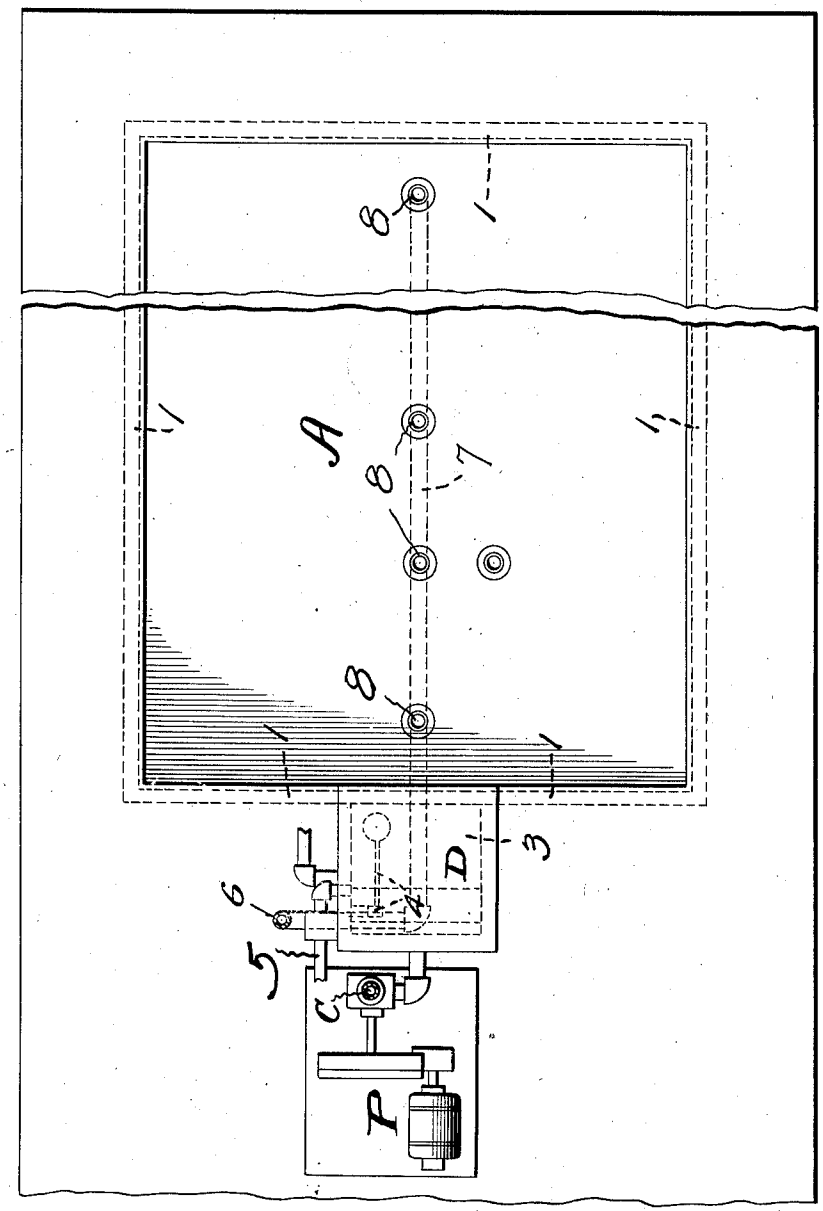
Dec. 1, 1925. 1,563,849

F. E. HARTMAN

PROCESS FOR PURIFYING AND CIRCULATING WATER IN SWIMMING POOLS

Filed April 22, 1922 2 Sheets-Sheet 1

Fig. 1.



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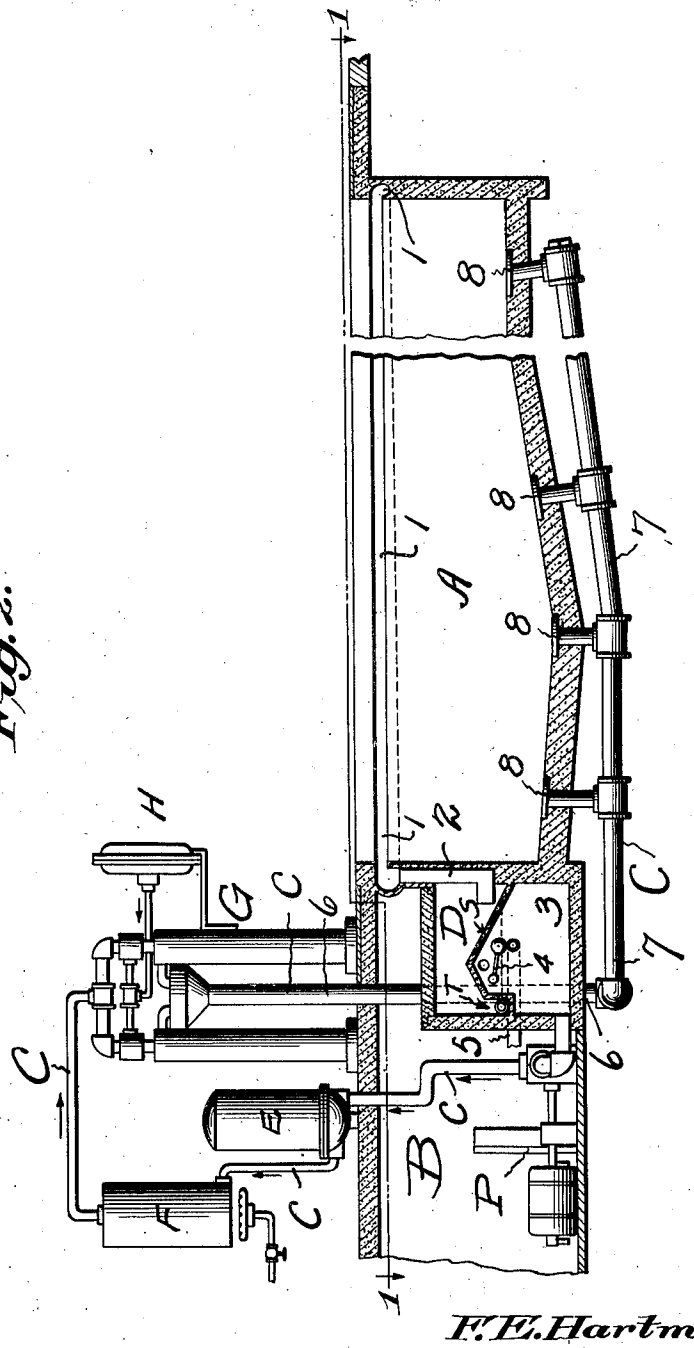
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Fig. 2.



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UNITED STATES PATENT OFFICE.

FRANK E. HARTMAN, OF SCOTTDALE, PENNSYLVANIA, ASSIGNOR TO ELECTRIC WATER STERILIZER & OZONE COMPANY, OF SCOTTDALE, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

PROCESS FOR PURIFYING AND CIRCULATING WATER IN SWIMMING POOLS.

Application filed April 22, 1922. Serial No. 556,049.

To all whom it may concern:

Be it known that I, FRANK E. HARTMAN, a citizen of the United States, residing at Scottdale, in the county of Westmoreland and State of Pennsylvania, have invented certain new and useful Improvements in Processes for Purifying and Circulating Water in Swimming Pools, of which the following is a specification.

This invention relates to a novel method or process for purifying and circulating water in swimming pools of the type that usually constitute a part of the equipment of athletic institutions, gymnasiums, community centers or the like.

Obviously where the pool or tank is used by a large number of bathers the water becomes contaminated with impurities, many of which, nasal and pharyngeal discharges for example, being much lighter than water float on the surface until removed from the pool. As the bathers are in contact with the surface water more frequently than at deeper levels, the possibility of contamination is apparent, and therefore it is desirable to provide adequate means for constantly removing the surface water without depending on its displacement by a number of bathers entering the pool.

Heretofore it has been the general practice to supply fresh water at the top of the pool and withdraw it from the bottom, but at best this method only dilutes the water without effecting a complete charge thereof, and therefore fails to maintain an adequate standard of safety. As the water in the tank requires heating for the greater part of the year, when this warm water is supplied at the top of the tank it tends to remain on the surface, and, aside from creating stratas of cold and warm water, promotes germ propagation and thus increases the danger of contagion.

Accordingly, a primary object of the invention is to provide a process for maintaining the water in the pool at a maximum degree of purity at all times, regardless of the number of bathers using the pool, by circulating it upwardly from the bottom of the pool and outwardly toward the marginal edges thereof to constantly remove all surface matter or matter held in suspension, and at the same time maintain all the water in the pool at a uniform temperature, thereby providing a thoroughly safe, as well as comfortable, bath.

A further object of the invention is to provide a circulating process wherein fresh water may be automatically supplied to the circuit when necessary.

While it will of course be understood that the process herein described may be carried out in connection with various forms of apparatus, nevertheless there is shown in the accompanying drawings, more or less diagrammatically, the essential and preferred arrangement for carrying the process into effect.

In the drawings referred to:

Figure 1 is a plan view of the improved swimming pool and the combined circulating and purifying system therefor.

Figure 2 is a longitudinal sectional view of the construction shown in Figure 1, certain elements of the system being diagrammatically shown.

Similar reference characters designate corresponding parts throughout the several figures of the drawings.

As previously indicated, in the methods heretofore employed, and in which the fresh water is supplied at the top of the pool, the surface water only is diluted. Also, when warm water is introduced at the top, it tends to remain on the surface by reason of its lighter density and leaves a distinct line between the surface water and the remainder, forming definite stratas of cold and warm water which are not only uncomfortable but frequently result in such physical shocks as to endanger the health of the bather. Thus, by the methods heretofore in vogue no definite stream lines can be established from the top of the water to the point of exit at the bottom. Under these conditions, bacteria introduced into the pool by bathers will remain in suspension and multiply.

Accordingly, the present invention seeks to provide a process for circulating the water in the pool or tank in such a manner that the flow is from the bottom upward and outward, thereby not only moving the water at all times so that all portions of the pool are kept clean, but also discharging the heated water in such a manner that the full

benefit of its temperature is obtained as it rises through the tank without loss of heat, and also keeping the entire contents of the pool of a uniform temperature.

Obviously, various forms of apparatus may be utilized to carry the process into effect, but by way of illustration one form of apparatus is diagrammatically illustrated in the accompanying drawings in which the pool or tank A is provided with a circulating system designated generally as B, including suitable piping forming a water circuit C having therein an automatic water supplying device D as well as suitable filtering, heating and ozone purifying means respectively designated as E, F and G.

As will be observed from the drawing, the tank A is provided around the marginal edges thereof with an overflow trough 1, the same being preferably located near the top edge of the tank and draining into a common discharge outlet 2 which opens into the automatic water supplying device D. This device may be in the form of a sump chamber 3 included in the water circuit C and having therein a float controlled water supply valve device 4 for automatically supplying water from the inlet connection 5 to the sump. As the water discharges from the outlet 2 it passes through the screen S into the sump chamber 3, the said screen serving to arrest solid matter until it is washed over the crest of the wall supporting the screen into the trap T where it may be conveniently disposed of. When the water in the sump falls below a pre-determined level, the valve device 4 lets in fresh water.

For the purpose of maintaining the circulation of water in the circuit C, a pump unit P is utilized, the same removing the water from the sump and forcing it through the filtering, heating and purifying instrumentalities E, F and G, from which latter it is carried by the pipe 6 of the circuit to the distributing main 7. This main is preferably located beneath the tank A and provided with a plurality of discharge outlets 8, located at the bottom of the tank, distributed and arranged in any suitable and convenient location to effectively distribute the water throughout the pool so that the flow will be from the bottom of the tank upward and outward toward the overflow trough 1.

From the foregoing it will be observed that when the tank has been filled with water, the overflow therefrom passing into the sump chamber 3 will cause float valve device 4 to control the fresh water supply. If the water level in the tank tends to drop either from evaporation or by the water being carried away by the bathers, and inasmuch as the pump P is functioning to withdraw the water from the sump and circulate it as above described, the valve will be automatically opened and a sufficient amount of raw water will be received to automatically and constantly maintain the water in the tank at its peak so that there is a constant overflowing of the surface water from the tank. Inasmuch as the trough 1 surrounds the tank the surface water is constantly moving outwardly in all directions. Also as the warm water is introduced at a plurality of points at the bottom of the tank, said water will naturally rise to the surface and thereby set up stream lines running from the bottom to the top of the water. Consequently all floating matter held in suspension in any part of the water of the tank will be carried upwardly to the surface, and consequently this surface water together with the suspended foreign matter will be subsequently carried off through the trough 1 to the sump chamber 3. By introducing the warm water at the bottom of the tank the water in the tank is gradually heated to its entirety. The trap in the sump serves to separate the foreign matter carried by the overflow water from said water and disposed of all foreign matter, the separated water entering the sump and being subsequently pumped through the filter E, where any further impurities or foreign matter will be removed, thence through the heater F, and thence through the ozonizer G and back to the bottom of the tank.

It will, therefore, be seen that the overflow water is used over and over again, that all foreign matter is separated from said overflow water prior to the latter being returned to the tank; that the water in the tank is gradually heated in its entirety; that the ozonizer serves to destroy the bacteria in the water almost immediately upon its introduction and that the automatic float valve of the sump serves to prevent the water level of the sump from falling below a predetermined point and consequently by this means the loss of water from the tank, due to evaporation or otherwise, is automatically replenished and the water in the tank is maintained at a constant level. It will furthermore be observed that my improved method consists in removing the surface water together with foreign matter held in suspension in said surface water, separating said foreign matter from the surface water and returning said separated water to the tank.

Thus, the present process involves the provision of an apparatus providing a relatively closed circuit for carrying the water of the pool through heating and purifying instrumentalities and returning it to the pool, while at the same time obviating waste. On the other hand, when the water in the system becomes low from evaporation or being taken away by the bathers automatic means is provided for replenishing and shut-

ting off the supply, so that at all times the system maintains the fluid capacity of the tank.

Furthermore the means provided for straining the water in its course of circulation is another advantage because it prevents solid matter, which cannot be handled by the filtering and purifying apparatus, from clogging the pipes or connections and permits the free functioning of the apparatus under all conditions of use.

I claim:—

A process for purifying and circulating water in swimming pools which consists in introducing water at the bottom central portion of the pool at different points throughout its length in sufficient quantity to cause the surface water to continuously overflow uniformly over the overflow rail of the pool, thereby creating upwardly moving stream lines for assisting all foreign matter to the surface and carrying the same off with the surface water, then carrying the surface water to a strainer, subsequently purifying and heating the water, and finally returning the water to the pool.

In testimony whereof I hereunto affix my signature.

FRANK E. HARTMAN.