DISINFECTING SYSTEM FOR SWIMMING POOLS

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This invention relates to swimming pool purification systems and is directed particularly to the utilization of water disinfectant features of such systems to provide improved antiseptic foot baths.

It is now generally recognized that certain infectious ailments, particularly the fungus infection known as athlete’s foot, are commonly transmitted by the floors in and around swimming pools and showers. To prevent and remedy such infections it is common practice, required by law in some jurisdictions, to provide antiseptic foot baths adjacent pools and showers into which bathers may step. As such foot baths must be emptied, filled and charged with antiseptic at frequent intervals in order to keep them clean and to maintain the necessary concentration of antiseptic, they are generally provided in the form of movable shallow troughs usually made of rubber. These troughs however are awkward and inconvenient in use particularly because of their tendency to trip careless bathers.

There are moreover certain limits of effective concentration of the antiseptic in such foot baths; and the present system makes it difficult in practice to maintain the concentration within such limits. This is particularly true when the foot baths are used by a large number of persons, since each use depletes the antiseptic. This is particularly true where chlorine, hypochlorite and the like are employed. Troubles of the present type therefore require systematic and relatively frequent attention if they are to remain effective and sanitary. Moreover, a special supply of foot bath antiseptic must be kept on hand.

A purpose of the invention is to provide an antiseptic foot bath in which antiseptic of the proper concentration may be conveniently provided and maintained. This is in general accomplished by utilizing a particular type of swimming pool purification system to provide the necessary water charged with disinfectant for the foot bath. The invention contemplates therefore the combination of a swimming pool water purification system with an antiseptic foot bath arrangement in a single system providing material improvement in the effectiveness, convenience and servicing requirements of the foot bath arrangement without materially affecting the normal operation of the pool purification system.

The invention is particularly applicable to swimming pool water purification systems of the recirculating type in which the pool water is continuously recirculated through a purification cycle in which it is filtered, treated with disinfectant and returned to the pool, and especially to the type of such system in which the disinfectant is first added to a small fraction of the recirculating stream, such fraction being then returned to and mixed with the main body of water. This system has proven especially effective for the rapid and uniform dissemination of small quantities of disinfectant in large volumes of water.

In this arrangement there are two independent factors which affect the concentration of the disinfectant. One is the proper concentration for the pool; the other is the proper concentration for the foot bath. Public health authorities have established standards which fix the limits of the rate of disinfectant addition to swimming pool water; and it is general practice to maintain the rate of disinfectant supply as close as may be practical to the minimum of such requirements, partly for economy, but principally because of the adverse effect of larger proportions of disinfectant upon bathers. The rate of disinfectant addition for proper purification of the pool water is therefore fixed within narrow limits under any given conditions.

However, the concentration of antiseptic in the foot bath must also be maintained within certain limits which are established by entirely different considerations, namely, the maintenance of the concentration above the minimum which will be effective for combating foot infections and below a maximum which might be objectionable or even injurious. In this instance it is desirable to keep the concentration well above the minimum so as to assure effective and rapid germicidal action. The proper foot bath concentration is necessarily much greater than that required or permitted for swimming pool water purification.

A feature of the invention is the provision of a system in which these independent requirements of antiseptic concentration can both be satisfied; and a specific feature is the provision of an arrangement whereby either concentration may be varied without necessitating a permanent change in the other concentration. This is in general accomplished by utilizing the indicated system of pool water purification in which the disinfectant is added first to a fraction of the recirculating stream.

The invention does not materially affect the
rate of disinfectant addition, which is the same as that established by present practice, determined solely by the requirements of the swimming pool water, and which may be varied or adjusted in the usual manner.

With the present practice however, the rate of flow or volume of the fraction of circulating water with which the disinfectant is initially mixed is determined solely by mixing requirements, including the thorough distribution of the antiseptic initially in such fraction of the stream and the subsequent thorough mixing of the treated fraction with the remainder of the stream. In the present system, however, the relative volume of the water fraction is determined by the desired concentration of the footbath; and for this purpose such volume or rate of flow must be properly proportioned to the rate of antiseptic feed. A feature of the invention is the discovery that the requirements for effective dissemination or mixing of the antiseptic under previous systems are consistent with the requirements for the provision of a proper concentration of antiseptic in the footbath.

With this arrangement the foot bath concentration may be independently adjusted by adjusting the volume of the treated fraction; and when the rate of antiseptic feed is varied to meet changes in pool requirements, a corresponding change in the volume of the treated fraction will maintain the same foot bath concentration.

In a particularly advantageous form of the invention, a constant flow of the treated fraction of water through the foot bath is maintained. This arrangement not only maintains the optimum concentration of antiseptic at all times, but also keeps the foot bath in a highly sanitary condition with a minimum of attention. These results moreover are obtained without material expense after the system is installed, since the regular pool purification system is utilized.

The maintenance of a proper concentration of disinfectant in the footbath is particularly valuable when it is desired to use chlorine, hypochlorite, chloramine and the like, which are subject to more rapid reduction in concentration by the use of the footbath than are certain other types of disinfectant or fungicide. The invention therefore includes provision of a system in which the chlorine-containing disinfectant employed for pool water purification may likewise be utilized in the footbath without requiring frequent additions to prevent undue depletion of the antiseptic and consequent ineffectiveness of the bath.

Other objects and advantages appear from the following description presented in conjunction with the accompanying drawing which is a diagrammatic flow-sheet of an embodiment of the invention.

In the illustrated arrangement the water from the swimming pool 10 is circulated at a suitable rate through a main passage 11 by means of pump 12 and passes through a filter or filter system 13 before returning to the pool. A fraction of the water in passage 11 is diverted into a parallel or shunt passage in which it is mixed with the disinfectant and returned to passage 11. In the form illustrated the shunt passage includes branch passage 14 into which a fraction of the water from passage 11 flows, and return passage 15 through which such fraction is returned to passage 11, a suitable pump 16 in passage 15 maintaining the required flow through the shunt passage system.

Suitable means is provided for introducing disinfectant into the shunt passage at a carefully regulated rate, apparatus for this purpose being in general use and indicated diagrammatically in the drawing. This includes a disinfectant supply 17, a pump 18 connected to the supply and discharging into passage 14, and means for regulating the rate of feed of disinfectant, indicated diagrammatically as valve 19 in line 20 connecting the disinfectant supply 17 with the pump 18 and the passage 14. Passage 14 discharges into footbath 23; and if desired the disinfectant from supply 17 may be introduced directly into the feed side of the foot bath by suitable means, the illustrated arrangement employing gravity feed through line 24 controlled by valve 25.

The illustrated arrangement is adapted to be used either for periodic filling, emptying and replenishment of the foot bath 23, or for the provision of a continuous flow of disinfectant-charged water through the bath. Where the latter arrangement is employed the foot bath 23 is provided with a discharge passage 26 communicating with passage 15. When it is desired to employ an intermittent system, passage 26 is closed and the water from passage 14 is normally diverted through bypass 28 into passage 15 by means of three-way valve 29. When it is desired to replenish the foot bath 23 its contents are discharged to waste by opening valve 30 in waste pipe 31; and after the bath is drained valve 30 is closed and valve 29 is turned appropriately to fill the foot bath with fresh water containing disinfectant, after which valve 29 is again turned to direct the flow from passage 14 through by-pass 28.

Suitable means is advantageously provided for regulating the flow through passage 14. This may be accomplished in various ways as by the use of a suitable pump; but a simple construction is illustrated, employing valve 32. It is of course understood that pump 16 is of the adjustable type and is regulated to return the water from the shunt system at a rate, but not exceeding the rate of flow through passage 14.

With the system illustrated it will be apparent that the rate of disinfectant feed from supply 17 may be adjusted in accordance with present practice to satisfy the requirements of the water entering the main passage 11; while the concentration of disinfectant in footbath 23 may be adjusted independently of the rate of disinfectant addition by suitable manipulation of valve 29 or other flow controlling means in the shunt passage system.

It should be noted that while various connections and devices for providing different types of control and flow have been illustrated in a single system for convenience, the arrangement is such that the particular combination considered desirable for a given installation may be selected and the remaining features may be dispensed with. Moreover, while only a single footbath has been illustrated, it will be apparent that the system is adapted to supply a plurality of footbaths, and that different systems for providing the water and disinfectant to different footbaths in such a series may readily be employed. Certain features of the system as disclosed are moreover applicable to the supply of water and disinfectant to footbaths apart from treatment of swimming pool water, and may be employed for providing an antiseptic footbath water supply.
either in connection with the disinfection of water other than that used in swimming pools, or independently of the disinfection of swimming pool or other water supply.

I have described what I believe to be the best embodiments of my invention. I do not wish, however, to be confined to the embodiments shown, but what I desire to cover by Letters Patent is set forth in the appended claims.

I claim:

1. A disinfecting system for swimming pools comprising water purification apparatus, means for circulating water from a swimming pool through the purification apparatus and back to the pool, including means for separating a fraction of the circulating water, means for introducing disinfectant into said separated fraction in a concentration suitable for foot disinfection, means for returning said water fraction containing said disinfectant to the circulating water, a foot bath and means for supplying said foot bath with water taken from said fraction after the introduction of said disinfectant.

2. A disinfecting system for swimming pools as set forth in claim 1, including means for circulating treated water from said fraction continuously through the foot bath.

3. A disinfecting system for swimming pools as set forth in claim 1, including means for varying the rate of flow of said fraction and thereby varying the concentration of disinfectant in the foot bath.

4. A disinfecting system for swimming pools as set forth in claim 1, including means for continuously circulating the separated water fraction and means for intermittently supplying the foot bath with water taken from said fraction.

5. A disinfecting system for swimming pools comprising water purification apparatus, means for circulating water from the pool through the apparatus, and back to the pool comprising a main circulating passage connected to the pool at spaced points, a pump for forcing circulating water through the passage, a filter in the passage through which the circulating water is passed, a branch passage connected at its ends to the main passage, means for introducing water from the branch passage into the foot bath and means for introducing disinfectant into the water which is in the foot bath and for returning water containing disinfectant through the branch passage into the main passage.

6. A disinfecting system for swimming pools as set forth in claim 5, in which the water from the branch passage is circulated continuously through the foot bath and including a pump arranged to return water from the foot bath to the main passage.

7. A disinfecting system for swimming pools as set forth in claim 5, including means for adjusting the rate of disinfectant introduction in accordance with the requirements of swimming pool water purification, and means for adjusting the concentration of disinfectant in the foot bath in accordance with the antiseptic requirements of said bath by varying the rate of flow of said fraction to the foot bath.

8. A disinfecting system for swimming pools comprising water purification apparatus, means for circulating water from the pool through said apparatus and back to the pool comprising a main circulating passage connected to the pool at spaced points, a pump for circulating water through the passage, a filter in the passage through which the circulating water is passed, a branch passage connected at its ends to the main passage, means for forcing water from the main passage through the branch passage, a foot bath, means for introducing water from the branch passage into the foot bath, and means for introducing disinfectant into water which passes through the branch passage at a suitable point to maintain the foot bath charged with said disinfectant.

9. A method of purifying swimming pool water and providing an antiseptic foot bath in a single system which comprises circulating a stream of swimming pool water through a purification system, separating a fraction of the stream during circulation, introducing disinfectant into the separated fraction in a concentration suitable for foot disinfection, returning the fraction with the disinfectant distributed therein to the remainder of the stream, and supplying a foot bath with water containing disinfectant and taken from said fraction.

10. A method of disinfecting swimming pool water as set forth in claim 9, in which the separated water fraction and disinfectant are circulated continuously through the foot bath.

11. A method of disinfecting swimming pool water as set forth in claim 9, in which the concentration of antiseptic in the foot bath is adjusted by varying the rate of flow of the fraction of the circulating stream.

12. A method of disinfecting swimming pool water as set forth in claim 9, in which the rate of disinfectant introduction is adjusted in accordance with the requirements of the circulating stream to obtain proper swimming pool water purification, and the concentration of disinfectant in the foot bath is adjusted to obtain the proper disinfectant concentration for antiseptic foot treatment by adjusting the rate of flow of the antiseptic and water fraction to the foot bath.

13. A method of disinfecting swimming pool water as set forth in claim 9, in which the treated fraction of a circulating stream is continuously circulated, and the foot bath is supplied with water from said fraction containing disinfectant.

14. A method of purifying swimming pool water as set forth in claim 9, which comprises maintaining the continuous circulation of the separated fraction independently of the foot bath, and periodically diverting a portion of said fraction and antiseptic into the foot bath.

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