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METHOD OF CLEANING AND STERILIZING FILTER STONES.

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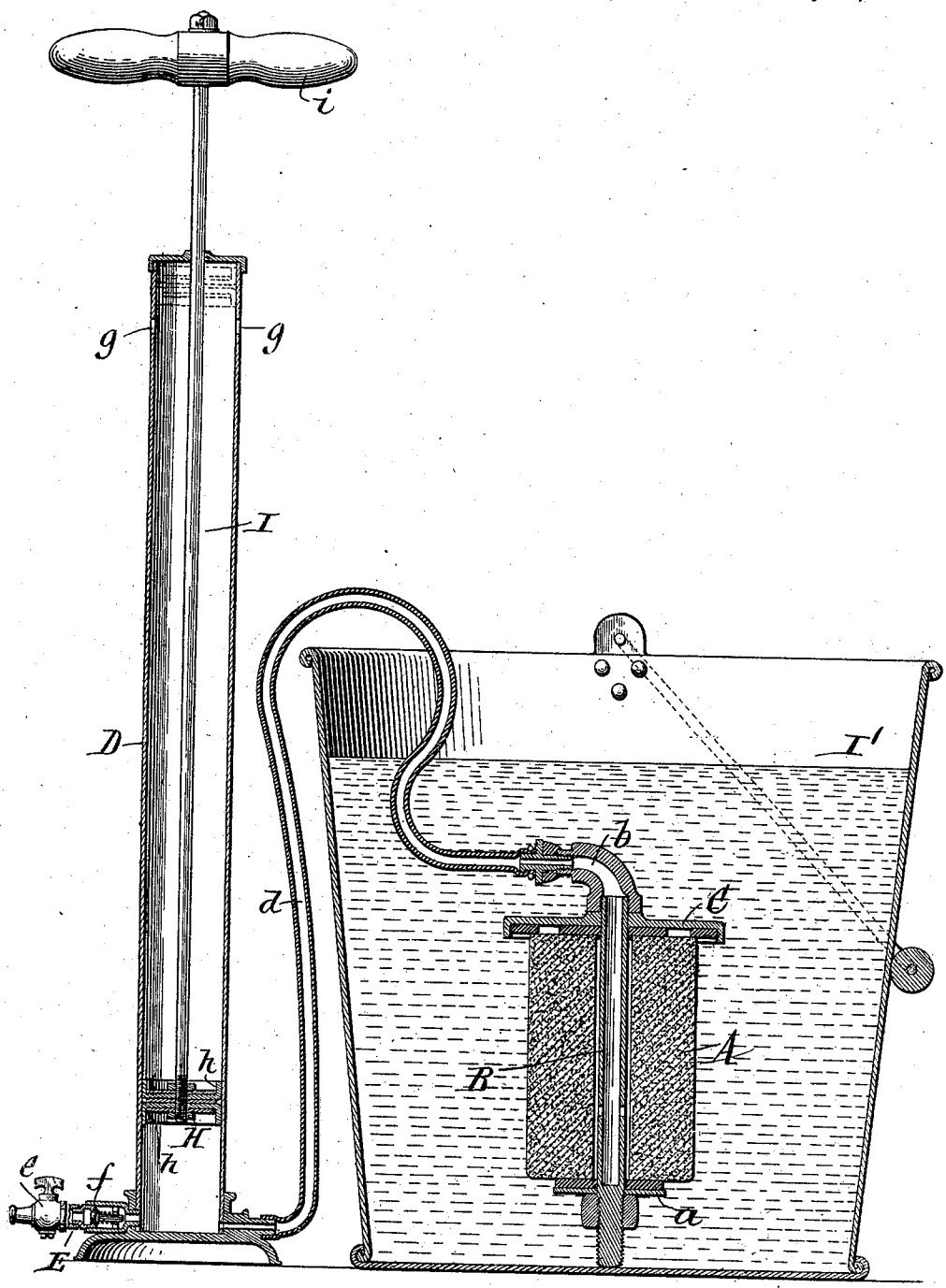
Patented July 12, 1910.



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METHOD OF CLEANING AND STERILIZING FILTER-STONES.

963,767. Specification of Letters Patent. **Patented July 12, 1910.**

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To all whom it may concern:

Be it known that I, HAROLD JARVIS, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented new and useful Improvements in Methods of Cleaning and Sterilizing Filter-Stones, of which the following is a specification.

This invention relates to a method of cleaning and sterilizing the porous cylinders or stones for water filters. As is well known the pores of these filter stones or cylinders in time become clogged with the impurities which they separate from the water and therefore require cleaning in order to restore the usefulness of the same. This has heretofore been attempted by washing the stone and also scraping the same which, however, is only partially effective inasmuch as the impurities such as bacteria and fine solid matter entering deeply into the pores of the stone cannot be reached by such means.

The object of this invention is to provide a method of cleaning the stones whereby the cleaning and bacteria destroying media is caused to penetrate and pass entirely through the pores of the stone and thereby effectually destroy any disease germs which have lodged in the pores of the same and cause the removal of such germs and other impurities from the stone so that the full efficiency of the same is restored. For this purpose the stone to be cleaned is placed in a body of hot water so that only that side or surface of the stone is immersed or comes in contact with the hot water at which the unfiltered water normally enters the stone but that side of the stone from which the filtered water normally leaves the stone is not in contact with the water. The latter is heated to a temperature which will destroy disease germs or bacteria. While thus immersed in the hot water air is forced through the pores of the filter stone from the delivery side to the supply side thereof, whereby all or part of the dirt, germs or other impurities contained within the pores are expelled therefrom and dissipated in the surrounding hot water which latter destroys the germs and renders the same and other disease breeding matter inert. A vacuum is now produced on the delivery side of the stone whereby the hot water is drawn from the supply side of the stone through its pores to the delivery side thereof, thereby destroying any germs in the pores of the stone which may still lodge therein. The hot water thus drawn through the pores of the stone from the supply to the delivery side thereof is now forced backwardly by air pressure through the pores of the stone from the delivery to the supply side thereof, whereby the lifeless germs and other impurities are carried out of the stone and into the surrounding hot water. This operation of drawing hot water forwardly through the pores of the stone and pushing the same backwardly therethrough in the manner described may be repeated as often as desirable or the condition of the stone requires to render the same absolutely sanitary and sterile before it is again used to filter water for drinking or other domestic purposes.

Inasmuch as the water which is drawn forwardly through the stone is filtered and therefore pure and is utilized to wash out the pores of the stone by forcing the same backwardly through the pores, contamination of the stone is avoided as would be the case if unfiltered water were forced backwardly through the pores for washing them out. After the stone has been thus rendered hygienic the same is removed from the bath of hot water,—compressed air is forced one or more times through its pores from the delivery side to the supply side thereof for the purpose of expelling any water or moisture remaining in the stone and completely cleaning and drying the same preparatory to again putting it to use.

The means for practicing my process for cleaning and sterilizing filter stone may be varied but the means shown in the drawings having been found satisfactory in practice are preferred and are constructed as follows:

A represents the water filtering stone which in this example is of cylindrical form and provided with a perforated delivery tube B which is secured at one end to a clamping head *a* at one end of the stone while its opposite end is connected with a clamping head C secured to the other end of the stone so as to close the same. When installed for use the unfiltered water passes through the pores of the stone from the outer or supply side thereof to the inner or delivery side of the same, thence through the perforations of the delivery tube and into the interior of the latter, and then is drawn off through the nipple or nozzle *b* at the outer end of the latter.

When the filter stone becomes clogged with the impurities or whenever it is desired to cleanse and sterilize the same it is removed from the filter shell, which is not shown in the drawings, and its delivery nipple is connected with means whereby the air within the stone may be alternately compressed and exhausted or air may be forced in successive blasts backwardly through the stone without creating a vacuum therein. The preferred means for thus manipulating the air with reference to the filter stone comprises an air pump having a barrel D having its lower end provided with a tube or conduit *d* and also provided with an air inlet pipe E containing a hand operated valve or pet cock *e* and a check valve *f* which opens inwardly but closes outwardly, one or more air openings *g* in the side of the barrel near its upper end, a plunger H reciprocating in said barrel and having two cup-shaped packings *h*, *h* which are turned in opposite directions and cause the plunger to propel the air in both directions of its movement, and a plunger rod I connected at its lower end with the plunger and provided at its upper end with a handle *i*.

Preparatory to treating the filter stone the same is removed from its shell and connected at the nozzle *b* of the outlet tube B with the conduit *d* and then immersed in a body or bath of water contained in a pail, tank or pan I^1 and having a temperature sufficiently high to permit of effecting sterilization. The plunger of the air pump is now depressed while the pet cock *e* is closed, whereby a charge of compressed air is forced through the pores of the filter stone from the inner or delivery side to the outer or supply side thereof and more or less of the impurities which obstructed or lodged in the pores are pushed outwardly therefrom into the hot water surrounding the stone, thereby dissipating these impurities and causing destruction by the heat of the water of any germs which have been ejected from the stone. After a charge of air under pressure has been thus forced backwardly through the pores of the stone the plunger of the air pump is raised while the pet cock *e* is still closed, thereby causing some of the hot water surrounding the stone to be drawn inwardly through the pores of the stone from the outer to the inner side thereof and destroy the germs that may be still present in the pores. This water which has been filtered during its passage forwardly through the stone is now pushed backwardly through the pores of the stone and into the body of water within the submerging tank by pushing the plunger downwardly. Water may be thus forced back and forth through the stone as often as desired by moving the plunger up and down accordingly.

It has been found in practice that, owing to the vacuum which is produced in the inner side of the filter stone and the conduits connecting the same with the pump barrel, air must be admitted to the barrel to break this vacuum before the plunger is depressed in order to permit of exerting an effective pressure for forcing the water backwardly through the pores of the stones. This is accomplished by drawing the plunger during the last part of its upward movement past the air openings *g* of the barrel, so that the external air may enter the barrel below the plunger, thereby breaking the vacuum and providing a full body of air in the barrel for the plunger to act upon and effectually drive the filtered water backwardly through the pores of the stone upon depressing the plunger.

After the stone has been cleaned the same is removed from the hot water bath, the pet cock *e* is opened and the plunger is reciprocated a number of times. At this time the plunger during each upward stroke draws air past the check valve *f* into the barrel instead of drawing air inwardly through the stone and during each downward stroke of the plunger the check valve *f* is closed causing the air expelled from the barrel to be forced outwardly through the pores of the stone. This operation is repeated as often as necessary to completely remove the moisture or water from the stone and dry the same ready to be restored to its shell for resuming the operation of filtering water.

I claim as my invention:

1. The herein described method of cleaning a water filter stone which consists in forcing air through the pores of said stone from the delivery side to the supply side thereof while the latter is immersed in water.

2. The herein described method of cleaning a water filter stone which consists in forcing air through the pores of said stone from the delivery side to the supply side thereof while the latter side is immersed in hot water.

3. The herein described method of cleaning a water filter stone which consists in forcing air through the pores of said stone from the delivery side to the supply side thereof while the latter side is immersed in hot water and then drawing said hot water through the pores of the stone from the supply side to the delivery side thereof.

4. The herein described method of cleaning a water filter stone which consists in forcing air through the pores of said stone from the delivery side to the supply side thereof while the latter side is immersed in hot water, then drawing said hot water through the pores of the stone from the supply side to the delivery side thereof and then forcing this water backwardly through the pores of the stone from the delivery side to the supply side thereof.

5. The herein described method of cleaning a water filter stone which consists in forcing air through the pores of said stone from the delivery side to the supply side thereof while the latter side is immersed in hot water, then drawing said hot water through the pores of the stone from the supply side to the delivery side thereof, then forcing this water backwardly through the pores of the stone from the delivery side to the supply side thereof and then forcing air backwardly through the pores of the stone from the delivery side to the supply side thereof while the stone is removed from the water.

Witness my hand this 20th day of December, 1909.

HAROLD JARVIS.

Witnesses:
THEO. L. POPP,
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