(No Model.) 3 Sheets—Sheet 1.

A. H. KOHLMEYER.

WATER FILTER.

No. 551,323. Patented Dec. 10, 1895.

Fig. I

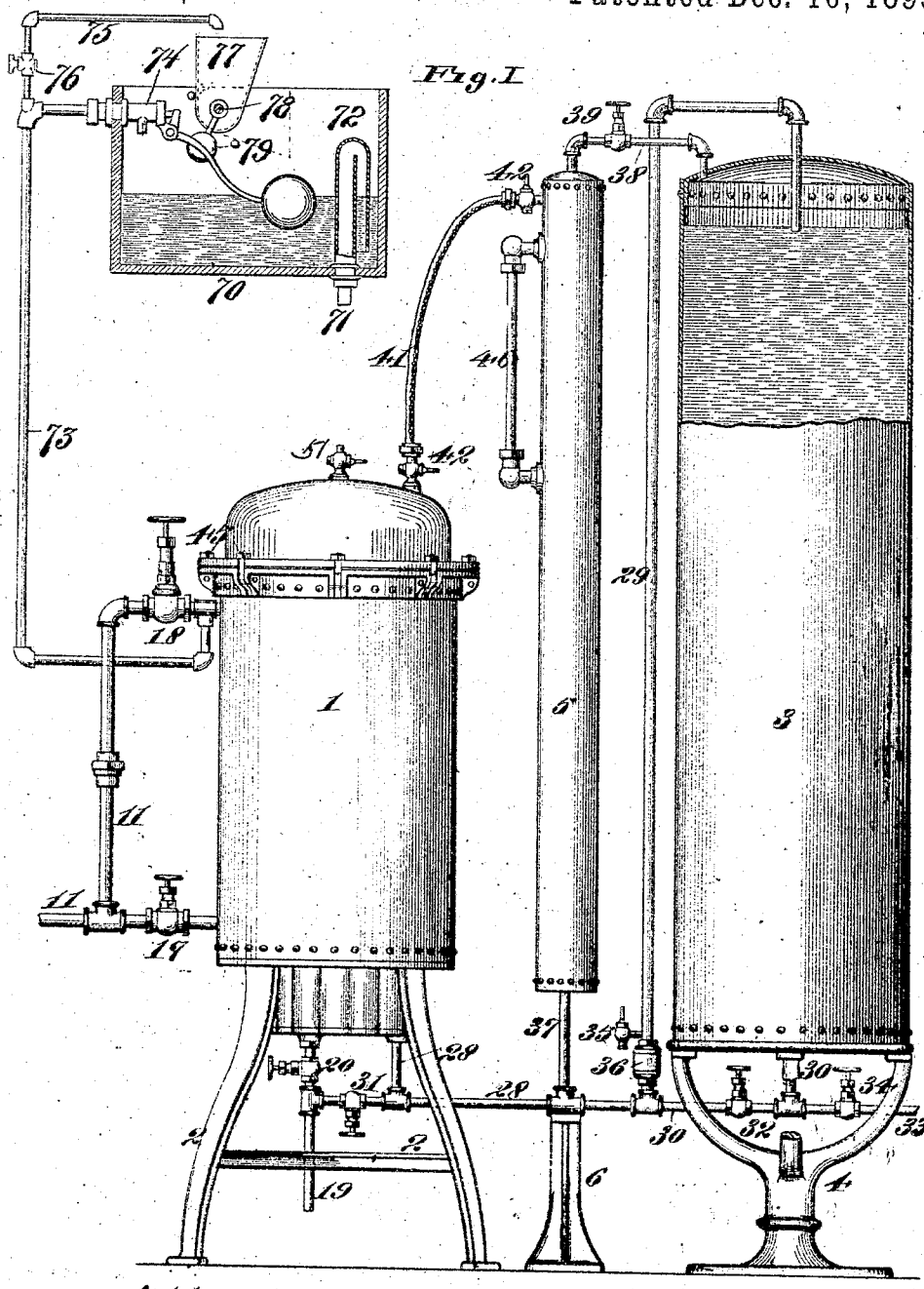

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Fig. II.

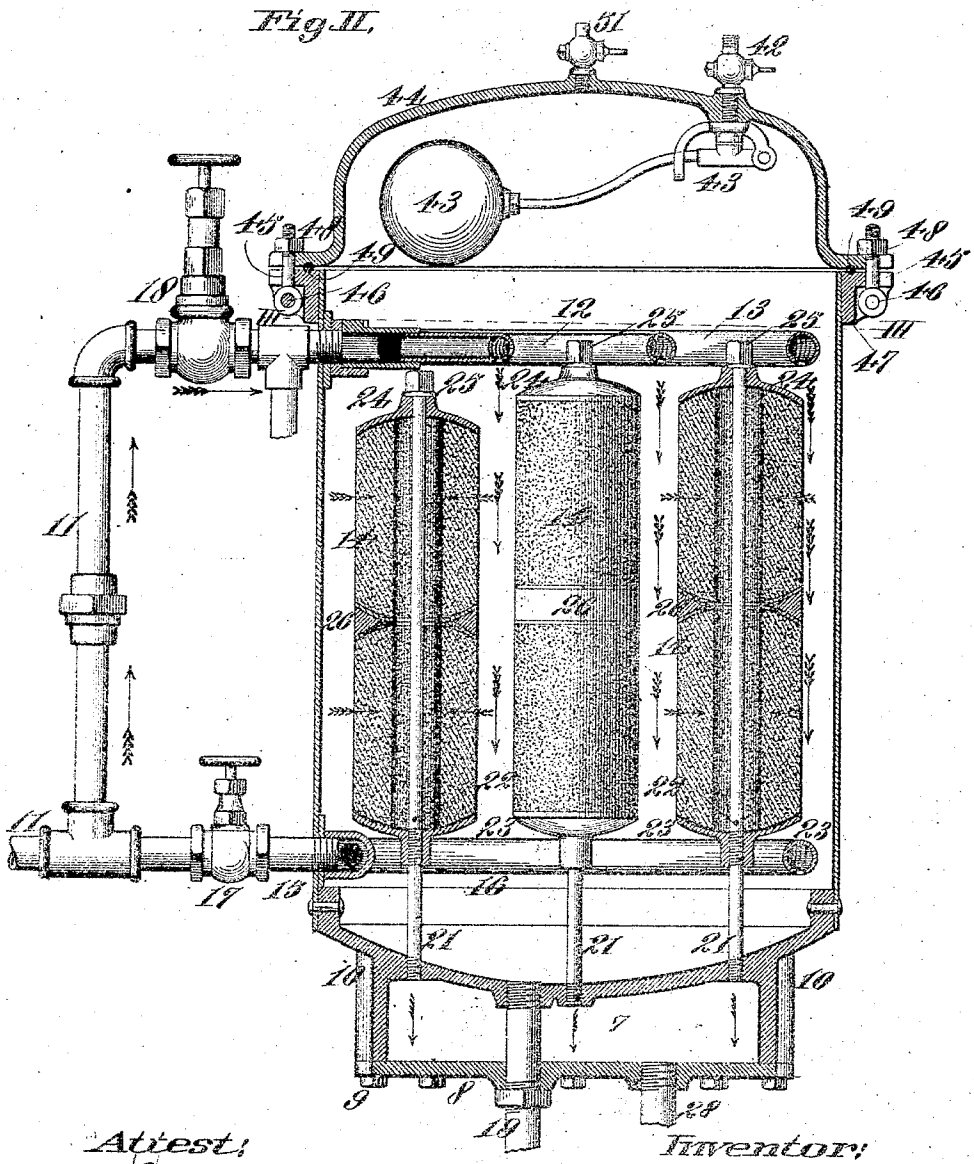

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Fig. III.

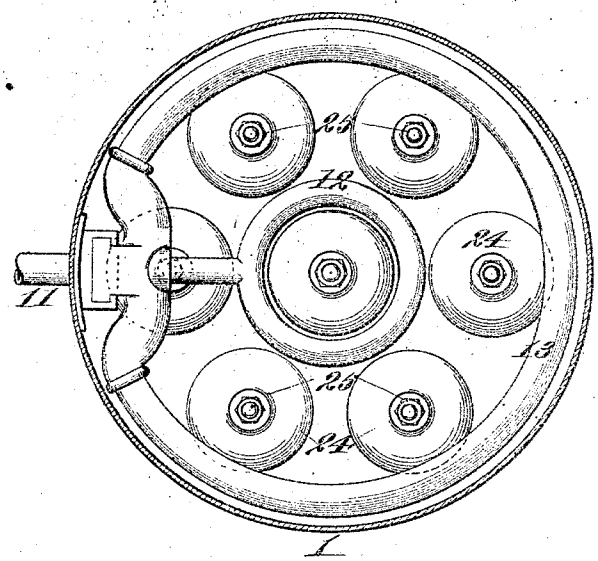


Fig. IV.

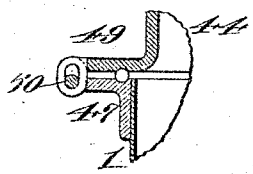
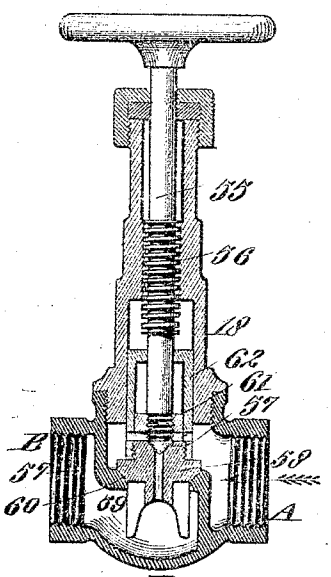


Fig. V.



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UNITED STATES PATENT OFFICE.

AUGUST H. KOHLMEYER, OF ST. LOUIS, MISSOURI.

WATER-FILTER.

SPECIFICATION forming part of Letters Patent No. 551,323, dated December 10, 1895.

Application filed August 13, 1894. Serial No. 520,196. (No model.)

To all whom it may concern:

Be it known that I, AUGUST H. KOHLMEYER, of the city of St. Louis, in the State of Missouri, have invented a certain new and useful Improvement in Water-Filters, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to certain improvements in water-filters of the general class shown in my Patent No. 510,348, dated December 5, 1893; and my present invention consists in features of novelty, hereinafter fully described, and pointed out in the claims.

Figure I is a side elevation of my improved water-filter, part of the receiving-tank being shown in section. Fig. II is an enlarged view of the filtering-tank and connecting-pipes, the parts being in section. Fig. III is a transverse section taken on line III III, Fig. II. Fig. IV is an enlarged detail view illustrating the manner of connecting the cap or hood of the filtering-tank. Fig. V is an enlarged vertical section of the supply-valve.

Referring to the drawings, 1 represents the filtering tank or chamber, supported on a suitable base 2.

3 represents the clear-water cylinder or storage-tank, supported on a suitable base 4 or otherwise, and 5 represents an auxiliary tank, supported on the base 6 or otherwise. At the lower end of the cylinder or chamber 1 is a chamber 7, the bottom 8 of which is secured in place by bolts 9, cast in the lower portion 10 of the cylinder 1.

11 represents the main supply-pipe from the water-main, or other source of supply, and which discharges preferably into the upper end of the filtering-tank. The inner end of the pipe 11, within the tank, is provided with a head, consisting of an inner ring 12, and an outer ring 13, (see Figs. II and III,) both of which receive water from the pipe 11. These rings are perforated at their lower surfaces, as shown in Fig. II, and through these perforations the water flows in streams, which are directed against the outer surfaces of the filtering blocks or stones 14, and tend to keep the outer surfaces of the stones washed clean of mud and sediment.

Connecting with the pipe 11 is a branch 15, extending into the lower end of the filtering-tank, and communicating with a perforated hollow ring or tube 16. This branch 15 is provided with a valve 17, and the pipe 11 is provided with a valve 18.

When it is desired to wash out the filtering-tank, the valve 18 is closed and the valve 17 is opened, when water will be discharged through the ring 16 and sprayed over the bottom of the filtering-tank, from whence it and the mud will be discharged through a pipe 19, (which is provided with a suitable valve 20,) connecting with the sewer or other place of discharge. When the filter is in operation, the valves 20 and 17 are closed and the valve 18 open.

There may be any number of the filtering stones or blocks 14, and they are preferably made of tripoli or natural stone. I have shown seven of these stones, but do not limit myself to any particular number. They are supported within the filtering-tank by means of pipes 21, having small perforations 22 within the filtering-stones, through which the filtered water passes from the interior of the stones into the chamber 7, as shown by the arrows, Fig. II.

On the pipes 21 are lower cup-shaped disks 23, threaded onto or otherwise secured to the pipes, and against which (with an intervening gasket, if desired,) rest the lower ends of the stones. At the other ends of the pipes are cup-shaped disks 24, fitting loosely on the pipes, and which bear (with interposed gaskets, if desired,) against the upper ends of the stones. Over the disks 24 are nuts 25 on the pipes 21. By tightening the nuts, the filtering-stones are clamped between the disks 23 and 24, and owing to the concave shape of the disks and the convex ends of the stones, the latter will be righted up into vertical position, as the nuts 25 are tightened. This manner of connecting the stones to the pipes is not, however, claimed by this application, as it is a feature shown and described in my application, Serial No. 492,665, filed December 4, 1893.

It frequently happens that short pieces of stone can be cheaply obtained, as, for instance, where one end of a stone is faulty or broken, and to provide for the use of such short pieces, I employ rings 26, which are

wedge-shaped in cross-section, as shown in Fig. II. By using these rings between the sections of a stone, a tight joint is formed and the stone as a whole is very strong and durable; the ends of the sections joining the rings being, of course, shaped to conform to the shape of the rings. If preferred, gaskets may be placed between the rings and the ends of the sections.

The clear water or storage tank 3 is connected to the chamber 7 of the filtering-tank by means of a pipe 28, from which rises a vertical pipe 29, that discharges the clear water into the top of the tank. The tank 3 may be located at any convenient place, and at any desired distance from the filtering-tank, and it may be drained into the pipe 19 by means of a pipe 30, connecting it with the pipe 19 through the pipe 28; the pipe 28 having a valve 31, and the pipe 30 having a valve 32, which are to be opened when the storage-tank is to be drained into the pipe 19.

The clear water is drawn from the tank 3 through means of a pipe 33, connecting with the pipe 30, and provided with a valve 34, which would be closed when the tank 3 is to be drained into the pipe 19. The pipe 29 is provided with a petcock 35, for admitting air to the tank 3 when the latter is to be drained, and the pipe 29 is further provided with a check-valve 36, to prevent air from escaping back through the pipe 29, when it is compressed in the tank 3 to a degree equaling, or in excess of the pressure of the water from the filtering-tank 1. The tank 5 is connected to the pipe 28 through means of a pipe 37, upon which the tank is supported on the base 6. As the water passes from the filtering-tank to the tank 3, a portion of it enters the auxiliary cylinder 5, and compresses the air therein until the air-pressure equals the pressure of the water. The water then stands in the auxiliary cylinder, under the tension of the air-pressure, and when the water-pressure in the supply-pipe 11 is reduced, the air-pressure in the cylinder 5 will force the water therein back through the pipes 37 and 28, and through the chamber 7 and pipes 21 out through the small perforations 22 in the pipes 21, and through the filtering-stones, thus cleansing the stones by filtered water passing through them in the opposite direction from which it passes during the filtering process. The small perforations 21 retard a rapid reflux of the water, so as to prevent danger of breaking the stones. This reflux of water takes place each time there is a reduction of water in the supply-pipe 11, and the cylinder 5 is filled again each time the pressure in the pipe 11 resumes its normal condition. By providing the auxiliary cylinder 5, the stones are thus cleaned without diminishing the supply of water in the clear-water tank 3, or without diminishing the pressure of the compressed air in the tank 3.

If it is desired at any time to utilize the air-pressure in the tank 3, through the cylinder 5, it may be done through means of a pipe 38, which connects the upper end of the tank 3 with the cylinder 5, and which is provided with a valve 39. The cylinder 5 is provided with a gage 40, and it is preferably connected to the tank 1 by means of a pipe or hose 41, provided with valves 42, so that air may pass from the tank 5 into the upper end of the tank 1, when desired, and vice versa, the end of the pipe 41 within the tank 1 being closed by a float and valve 43, when the water in the tank 1 reaches the float, (see Fig. II,) thus avoiding the possibility of water passing from the tank 1 into the cylinder 5, without passing through the filtering-stone.

The cap or dome 44 of the tank 1 is preferably secured in place by means of rods 45, (see Fig. II,) pivoted or hinged at 46 to the top ring 47 of the tank 1, the bolts 45 fitting in notches in the ring 47, and in notches formed in the out-turned flange of the cap 44, and the bolts having nuts 48 on their upper ends by which the cap is drawn down tightly in place. By loosening on the nuts 48 the bolts are allowed to drop back on their hinges 49, and the cap can then be removed to allow access to the interior of the tank.

49 (see Figs. II and III) represents a gasket or packing-ring between the cap of the tank and the ring 47, to insure a tight joint.

In Fig. IV I have shown the cap hinged to the ring 47 at 50, so that the cap can be opened out on this hinge when the bolts 45 are removed.

51 represents a petcock to permit the escape of air from the filtering-tank when the water is first admitted.

It is highly desirable to have the water pass through the filter slowly, so that the sediment will not be carried into the pores of the stones, but will collect on the outer surfaces of the stones. It is also desirable, when there is a reflux of water, as stated, that it should be quick and active through considerable pressure, so as to wash the dirt and sediment from the outer surface of the stones. I accomplish these results through means of a specially-formed valve 18, (see Fig. V,) which, as stated, is located in the pipe 11. The stem 55 of this valve is threaded at 56 into the housing of the valve. The lower end of the stem 55 is formed with a conical point 57, seated over a port or passage 58 in the valve proper 59. The valve 59 is seated at 60 in the housing. On the lower end of the stem 55 is a link or collar 61, fitting within a hollow neck or tube 62, which is threaded onto the valve 59.

When it is desired to admit a small flow of water through the valve, the stem 55 is run back far enough to carry the conical point of the stem 55 away from the valve 59, and then all the water that will pass through the port 58 (the water entering through the side A of the valve) will do so, and this will be the amount of water which will be permitted to pass through.

If at any time it should be desired to provide for a strong flow of unfiltered water through the valve, the stem 55 is run back until the collar 61 comes against the upper end of the hollow neck 62, and then the valve 59 will be raised from its seat, allowing a free open passage of water through the filter.

The valve construction also affords a free reflux of water through the valve when the stem 55 is raised from the valve 59, as the water in its return through the side B of the valve acts to raise the valve from its seat and pass freely through.

For the purpose of causing an automatic reduction in the pressure of water on the supply side of the filtering-tank 1, so that the pressure of water on the discharge side of the filtering-tank will cause the water to be forced back through the filtering-stones, I employ a tank 70, with the bottom of which connects a waste-pipe 71, provided with an ordinary siphon 72 within the tank.

73 is a pipe leading from the supply-pipe 11 between the valve 18 and the tank 1 to the tank 70. On the inner end of this pipe, within the tank, is an ordinary float-valve 74.

75 is a pipe leading from the pipe 73, and which is preferably provided with a valve 76.

77 is a cup mounted on a rock-shaft 78, by which it is supported within the box.

79 is a counterbalance-weight on the shaft 78.

The operation is as follows: The water runs into the tank 70, through the pipe 73, until the tank is filled to about the extent shown in Fig. I. The float then closes the valve 74 and prevents a further passage of water into the tank, through the valve. During this time the water is passing through the filtering-tank, and a small portion of water is passing through the pipe 75 into the cup 77. When the cup 77 is full, or is partially filled and overbalances the weight 79, the cup turns over and is dumped into the tank 70. This operation continues until the water in the tank reaches the top of the siphon, and then the water flushes out of the tank, permitting the float-valve 74 to open. As soon as the valve 74 opens, the water instead of passing through the filtering-tank 1, passes through the pipe 73 into the tank 70, thus removing the pressure from the supply side of the filtering-tank, so that the pressure on the discharge side of the filtering-tank will cause a back flow of water through the filtering-stones, to clean them.

By connecting the pipe 73 with the pipe 11 between the valve 18 and the tank 1, a comparatively small amount of water passes through pipe 73 to what would have to pass through this pipe, to entirely remove the pressure from the supply side, to what would pass through did the pipe 73 connect with the supply-pipe 11 back of the valve 18.

I claim as my invention—

1. In a water filter, the combination of a tank, sectional stones located within the tank, and rings for connecting the sections of the stones together; said rings being approximately wedge shape in transverse section, and the ends of the sections being shaped to conform to the shape of the rings; substantially as set forth.

2. In a water filter, the combination of a filtering tank, an auxiliary tank, a connection 41 between the tanks, and a float valve 43 located within the filtering tank, and adapted to close said connection; substantially as set forth.

3. In a water filter, the combination of a filtering tank, a storage tank, a supply pipe, a reduction valve located in the supply pipe, a tank, a pipe connecting the supply pipe with said tank, and which communicates with the supply-pipe between said reduction valve and the filtering tank, a float valve located in said tank, a discharge pipe provided with a siphon connecting with the said tank, and a pipe 75 for dripping into said tank; substantially as, and for the purpose set forth.

4. In a water filter, the combination of a filtering tank, a storage tank, a supply pipe, a valve located in the supply pipe and an automatically operated mechanism connected with the supply pipe between said valve and tank, whereby the pressure in the supply pipe is automatically diminished, for the purpose set forth.

AUGUST H. KOHLMEYER.

In presence of—
E. S. KNIGHT,
C. G. EDWARDS.