No. 811,485.

PATENTED JAN. 30, 1906.

D. COCHRANE.

MEANS FOR PURIFYING AND REGULATING WATER.

APPLICATION FILED MAY 16, 1905.

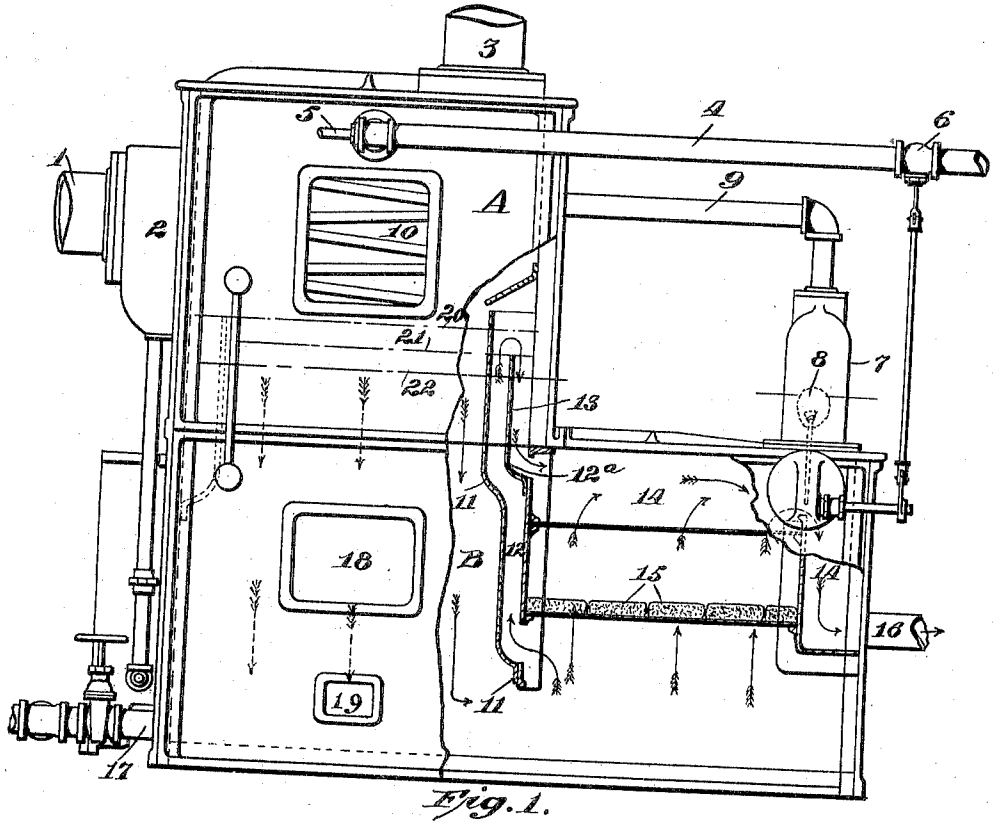

Fig. 1.

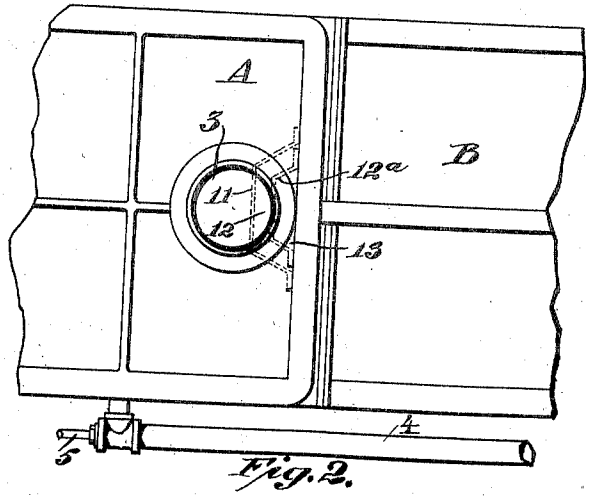

Fig. 2.

Attest:

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DAVID COCHRANE, OF PHILADELPHIA, PENNSYLVANIA.

MEANS FOR PURIFYING AND REGULATING WATER.

No. 811,485. Specification of Letters Patent. Patented Jan. 30, 1906.

Application filed May 16, 1905. Serial No. 260,898.

To all whom it may concern:

Be it known that I, DAVID COCHRANE, a citizen of the United States, and a resident of No. 1814 North Twenty-seventh street, in the city and county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Means for Purifying and Regulating Water, of which the following is a specification.

My invention relates to improvements in water purifiers and regulators, and especially to those where a chemical reagent is added to the water-supply.

The objects of my invention are to, first, automatically secure an adequate supply of water at all times and yet, second, to maintain this supply in the greatest possible state of purity and efficiency attainable by the apparatus; third, to provide means, preferably within and integral with the apparatus itself, to secure these ends. These objects I attain by the devices described and claimed hereinafter and illustrated in the accompanying drawings, in which like characters of reference refer to like parts throughout the respective views.

Figure 1 is an elevation of a feed-water heater and purifier containing my invention and having its casing broken away in part to show the filter-bed and the special means for diverting the water which alone and in combination constitute my invention. Fig. 2 is a plan view of a part of the same.

When water-purifiers are provided with filters, the latter eventually become clogged or choked with the impurities unable to get through and which have been caught and retained by the material or substance of the filter. Especially is this true when a chemical reagent is used to cause a precipitation of the suspended impurities. It then follows that the supply of water which ultimately passes in the usual way through the clogged filter is too small for the purpose for which it is required, and it becomes necessary to supplement it. It is of course desirable that this supplement shall be as nearly as possible in the completely purified condition, and since the obstruction arises in the filter, which is the last step in the process, the supplementary supply should be taken from a point very close to, but in front of, the filter. Thus at the worst it will be in a fairly purified condition. It is also important that this supplement shall be automatically supplied according to the demand.

I prefer to use a horizontal filter and lead the circulation up through the filter-bed from below, though I do not limit myself to that arrangement. This enables me to secure a sediment-chamber beneath the filter-bed which may be easily washed out. Moreover, the precipitation falls away from rather than onto the filter-bed, making it less likely to choke. My special improvement, however, lies in the peculiar form, arrangement, construction, and location of my increment chamber or by-pass, which I build inside of my heater-casing and preferably integral with it, as will be seen on referring to the drawings.

In Fig. 1, A is a heater, and B a collecting or filter-tank, preferably but not necessarily placed beneath the heater. 1 is a steam pipe or exhaust from engine or other source; 2, a separator; 3, exhaust from heater to atmosphere; 4, feed-supply pipe; 5, chemical-supply pipe; 6, valve in feed-supply pipe operated by float 8 through intermediate levers, &c.; 7, float-chamber having vent 9; 10, drip-trays shown through open manhole; 11, a shield or apron, preferably formed of plates secured to and really forming part of the general structure of the tank and filter-frame and forming a conduit or inclosed passage 12 extending from near the bottom of the tank to a point above the water-line and vented at the top. 12^a is a partition in this conduit forming a passage 13, open at the top and at the bottom communicating with the space or outflow-chamber 14 beyond the filter 15, from which the outflow is taken through the pipe 16. 17 is a waste-pipe controlled by a valve through which the sediment accumulated in the tank may be washed out. 18 19 are man and hand holes.

The operation of the device is as follows: The feed entering the heater through 4 is mixed with the chemical reagent entering through 5 and passing into the trays 10 becomes heated by the steam entering through 12. Falling then into the tank, as shown by the dotted arrows, a precipitation of suspended impurities begins to take place, which precipitation collects on the bottom of the tank and may be periodically removed through the waste-pipe 17. The circulation continuing through the filter 15 ultimately passes into the chamber 14 and is removed by the pumps or other means through outlet 16. A portion of the precipitated sediment is of course carried with the current into contact with the filter-bed and at length partially

chokes it so much so as to seriously reduce the available supply of water passing through it, and hence available at the outlet 16. As soon as the outflow is reduced materially from the normal the water-level rises in the tank from 22, when the float-operated valve 6 is wide open, and which is the normal water-level when the apparatus and filter are working at full capacity, to 21, at which point the feed is being reduced owing to position of float 8. At 21 the water begins to overflow the partition 12^a, passing down through 16, supplementing automatically and as required the amount passing through the filter 15. Moreover, the deficiency is thus made good by an increment taken from that part of the apparatus where the most purified water has collected. Thus the increment, though unfiltered, has been subjected to all the other steps of the treatment.

It is evident that my improvement is not limited in its application to any particular kind of water heating and purifying system, as the one illustrated; nor is it confined to a heater and purifier, either chemical or otherwise, as it might be applicable in a purifier alone and either chemical or otherwise; nor do I limit myself to any particular purpose for or process of heating or purifying, nor to the purification of any particular liquid, as water, nor to any special form and arrangement of parts in combination.

Where in the specification or the claims I have used the words "beyond the filter" I mean a point on the outlet side of the filter. By "normal water-line" I mean the water-line established when the system, including the filter, is normally operating. By "integral" I mean not necessarily homogeneous, but structurally unified.

What I claim, and desire to secure by Letters Patent, is—

1. The combination of a water-heater, a collecting-tank communicating therewith; a filter in said tank; an outflow-chamber, and a conduit within the tank, open at the bottom and extending from the lower portion of the tank to above the normal water-line; a partition in said conduit extending from near its top and forming a passage communicating with the outflow-chamber.

2. The combination of a water-heater, a collecting-tank communicating therewith; a filter in said tank forming an outflow-chamber; a conduit within said tank leading from above the normal water-line therein to the outflow-chamber, and an inclosing conduit open at the bottom and extending from the lower portion of the tank over the first-mentioned conduit communicating therewith and inclosing the same.

3. The combination of a water-heater, a collecting-tank communicating therewith; a filter in said tank, and an inclosed passage in the tank, leading from the lower part of the same to the outflow, and vented at the top.

4. The combination of a tank; a filter therein; an outflow-chamber beyond the filter, and an open passage vented at the top, connecting the lower portion of the tank with the outflow-chamber.

5. The combination of a tank; a filter therein, and an open passage within the tank vented at the top and connecting the lower portion of the tank with the outflow.

6. The combination of a tank; a filter therein, and an interior integral conduit vented at the top connecting the lower portion of the tank with the outflow.

7. The combination of a tank; a horizontal filter therein; an outflow-chamber beyond the filter, and a passage from the tank below the filter up to, and vented at the water-line, and communicating with the outflow-chamber.

8. The combination of a tank, a horizontal filter therein, and a passage in the tank between the lower part of the tank below the filter and the outflow, said passage extending to the normal water-line and vented thereat.

Signed at Philadelphia, in the county of Philadelphia and State of Pennsylvania, this 25th day of April, A. D. 1905.

DAVID COCHRANE.

Witnesses:
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JOSEPH M. HEWLETT.