

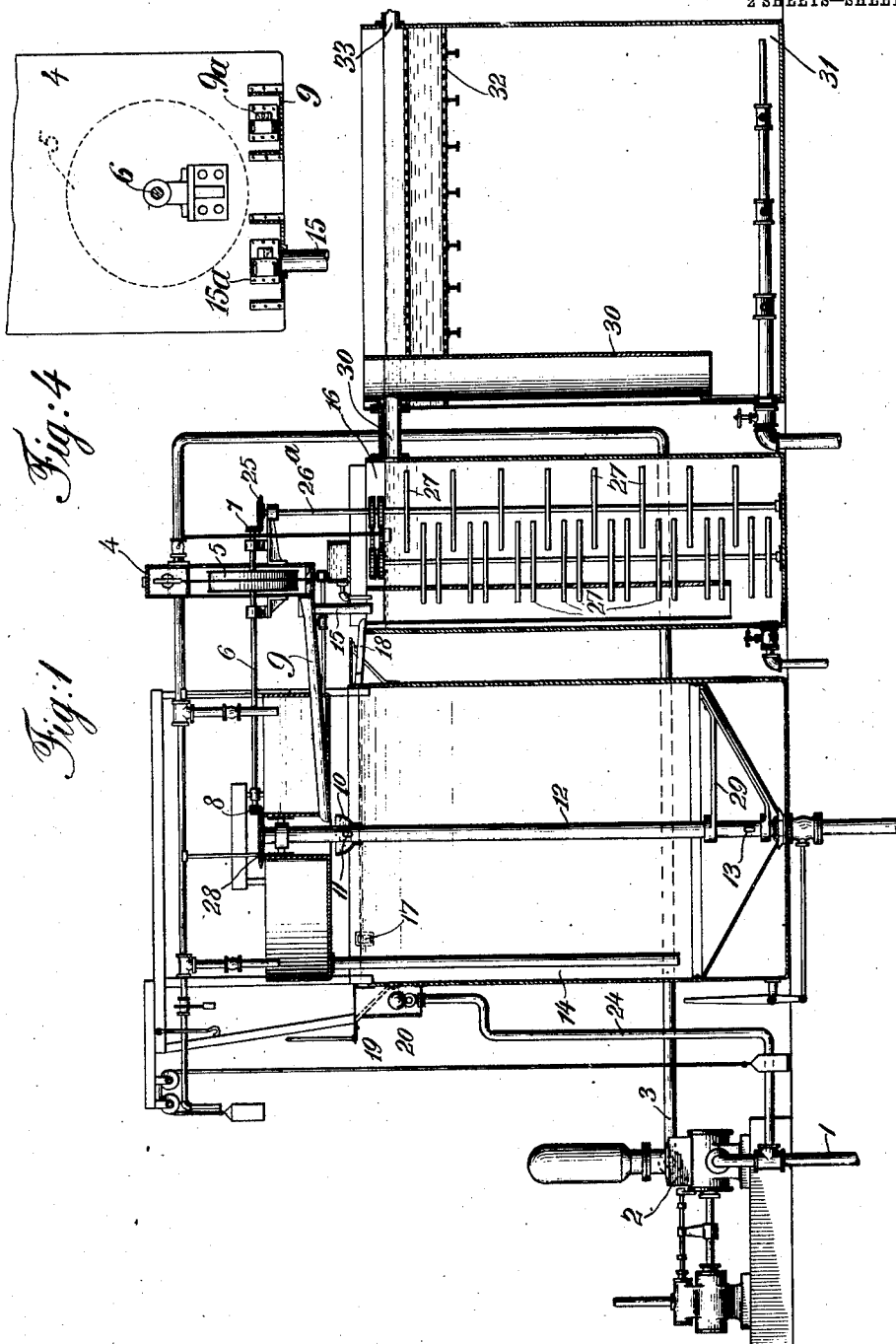
No. 850,503.

PATENTED APR. 16, 1907.

H. H. SUTRO.
APPARATUS FOR TREATING LIQUIDS.

APPLICATION FILED AUG. 25, 1906

2 SHEETS—SHEET 1.



WITNESSES:
D. P. Foster
W. H. Manchester

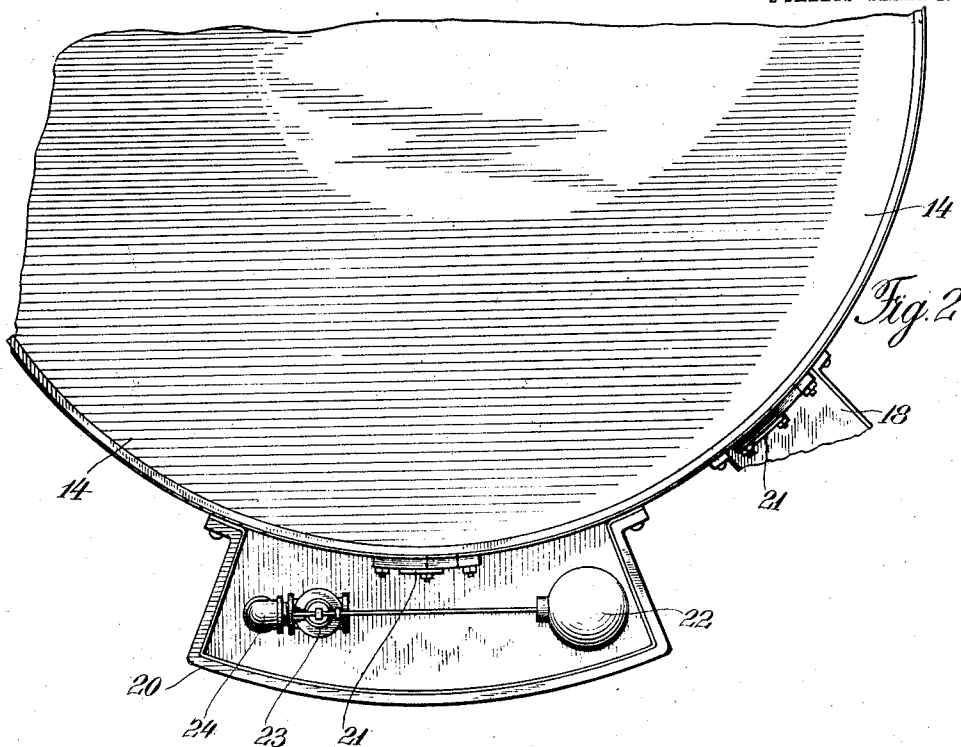
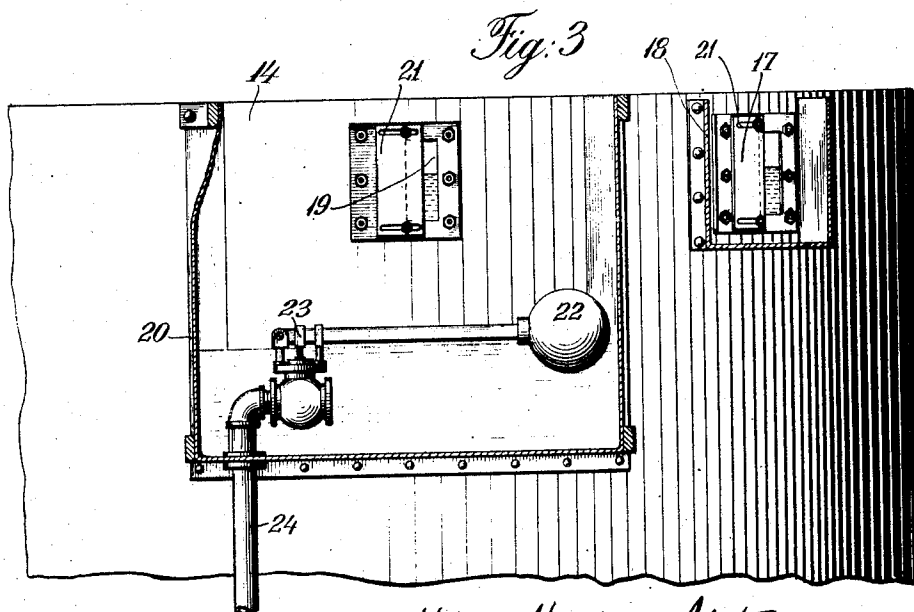
Harry Herbert Sutro INVENTOR
BY HIS ATTORNEY Henry M. Brigham

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By his Attorney Henry M. Dinkham

UNITED STATES PATENT OFFICE.

HARRY HERBERT SUTRO, OF NEW YORK, N. Y.

APPARATUS FOR TREATING LIQUIDS.

No. 850,503.

Specification of Letters Patent.

Patented April 16, 1907.

Application filed August 25, 1906. Serial No. 331,980.

To all whom it may concern:

Be it known that I, HARRY HERBERT SUTRO, of the borough of Manhattan, in the city, county, and State of New York, and whose post-office address is No. 126 Liberty street, in said borough of Manhattan, New York city, New York, have invented certain new and useful Improvements in Apparatus for Treating Liquids, of which the following is a specification.

The object of my invention is to provide a simple and effective apparatus for treating liquids with chemical reagents and to provide means whereby a sufficient amount of chemical reagent shall be supplied to the liquid to be treated before it enters the reaction-tank, and preferably at the point where or before it enters the apparatus, to prevent any injury to the apparatus by means of any acid or other substances contained in the liquid to be treated, and the particular features of my invention are pointed out in the appended claims.

The accompanying drawings illustrate an apparatus for the purification of water with my improvement attached thereto. I do not desire, however, to limit my invention to apparatus for the purification of water, as it is apparent that my invention may be used in connection with apparatus designed for other purposes.

In the accompanying drawings, Figure 1 is an elevation, partly in section, of my improved apparatus. Fig. 2 is a plan view of the auxiliary tank and a portion of the lime-water tank. Fig. 3 is an elevation, partly in section, of a portion of the lime-water tank, showing the auxiliary tank and the gates through which lime-water is drawn from the lime-water tank. Fig. 4 is an elevation, partly in section, of the water-wheel box, showing the gates through which the water flowing through the box is distributed.

In the accompanying drawings, 1 is a pipe communicating with the source of water-supply.

2 is a suction-pump.

3 is a pipe through which the water is forced by the pump to the wheel-box 4.

5 is an overshot water-wheel of the ordinary construction; 6, the shaft upon which the wheel is mounted and which rotates with the wheel.

7 and 8 are beveled gears mounted upon

the respective ends of the shaft 6. A predetermined portion of the water which flows into the wheel-box 4 is discharged into the chute 9 through the adjustable gate 9^a and flows into the funnel 10 and through the opening 11 into the pipe 12 and is discharged through the openings 13 into the bottom of the lime-tank 14. The balance of the water flowing into the wheel-box 4 is discharged through the adjustable gate 15^a and pipe 15 into the reaction-tank 16.

By the means shown the water to be treated is supplied to the wheel-box and as it flows from the wheel-box is divided into two streams, bearing a relative predetermined proportion each to the other. One of these streams is fed to the lime-water tank and the other to the reaction-tank. The lime-water tank 14 is provided with two overflow-outlets, one, 17, discharging into the reaction-tank 16 by means of the chute 18, and the other, 19, discharging into the auxiliary tank 20, which is located at the side of the lime-water tank. These two overflow-openings are provided with gates 21, by the lateral adjustment of which the overflow can be regulated. The tank 20 is provided with a float 22 and a valve 23, communicating with a pipe 24. When the liquid in the tank 20 has risen to a predetermined height, the float 22 opens the valve 23, and the liquid contained in the tank, which is usually lime-water when the apparatus is intended for the purification of water, is drawn by the pump 2 through the pipe 24 into the intake-pipe 1, as the water to be purified enters the apparatus.

In many cases the water to be purified contains acid, and if this is not neutralized at the point where the liquid enters the apparatus the apparatus, which is composed of metal, will be quickly corroded and destroyed. If all of the lime which it is necessary to supply to the water in order to properly purify it were supplied at this point, the impurities contained in the water would be deposited in the form of precipitate, which would clog and foul the apparatus and seriously interfere with and finally interrupt its operation. I therefore by the regulation of the gate 19 supply to the water through the pipe 24 a sufficient amount of lime water to neutralize the acid, but not a sufficient amount to cause any deposit of precipitate, the additional lime water necessary

to, complete the purification being supplied through the overflow-opening 17 and the chute 18 to the reaction-tank. While the pump 2 is in operation, it is constantly drawing a supply of lime water from the tank 20. If it is working rapidly, a larger amount of water to be purified is being supplied to the wheel-box 4, and consequently an increased volume is being supplied to the tank 14, which causes an increased overflow into the tank 20, thereby raising the float 22 and opening to a greater extent the valve 23 and permitting a larger amount of liquid to be drawn therefrom through the pipe 24 to the water which is passing through the apparatus. If a lesser amount is being pumped through the pipe 3 to the wheel-box, a lesser quantity of water is being supplied to the tank 14, and the overflow into the tank 20 is likewise proportionately reduced, and I am enabled by the means described to feed to the pipe 1 a proportionate quantity of lime-water irrespective of the quantity of water which is being pumped through the pipe 3 to the apparatus. 25 is a beveled gear mounted upon a shaft 26^a, upon which are mounted agitators 27 for the purpose of thoroughly mixing the water and chemical reagents contained in the reaction-tank 16. 28 is a beveled gear mounted upon the hollow shaft 12. 29 is an agitator mounted on the lower end of the shaft 12 for the purpose of stirring or agitating the water and particles of lime, so as to insure the thorough saturation of the water with lime as it rises in the tank. 30 is an overflow-pipe leading from the reaction-tank to the bottom of the settling-tank 31. 32 is a filter contained in said tank, and 33 is the outlet-opening through which the purified water is drawn from the settling-tank.

Having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In an apparatus for purifying liquids the combination with a reaction-tank of a chemical reagent-tank, means for supplying liquid to the reaction-tank, means for supplying a proportionate amount of reagent from the reagent-tank to the liquid as or before it enters the apparatus and means for supplying a proportionate part of the reagent to the reaction-tank, substantially as and for the purposes set forth.

2. In an apparatus for purifying liquids the combination with a reaction-tank of a chemical reagent-tank, means for supplying a proportionate part of the liquid to be treated to the chemical reagent-tank, means for supplying the balance of the liquid to be treated to the reaction-tank, means for supplying a proportionate amount of the discharge from the reagent-tank to the liquid as or before it enters the apparatus and means for supplying the balance of the discharge from the reagent-tank to the reaction-tank,

substantially as and for the purposes set forth.

3. In apparatus for purifying liquids the combination with a reaction-tank of a chemical reagent-tank, means for supplying liquid to the reaction-tank, means for supplying a portion of the reagent to the liquid to be purified before it reaches the reaction-tank and means for supplying the balance of the reagent necessary to complete the purification to the liquid after it enters the reaction-tank, substantially as and for the purposes set forth.

4. In an apparatus for treating liquids the combination with a reaction-tank, of a reagent-tank, means for dividing the liquid to be treated into proportionate parts and conducting one of said parts to the reaction-tank and the other portion to the reagent-tank, means for separating the liquid discharged from the reagent-tank into proportionate parts, means for conducting one of said proportionate parts to the reaction-tank and the other proportionate part to the liquid to be treated before it enters the reaction-tank, substantially as and for the purposes set forth.

5. In apparatus for treating water a reagent-tank with two reagent-outlets and means for conducting the discharge from such outlets to different destinations, substantially as and for the purposes set forth.

6. In apparatus for treating water, a reagent-tank, a reaction-tank, means for discharging reagent from the reagent-tank, means for conveying a predetermined portion of such discharge to the reaction-tank and means for conveying the balance of the discharge from said reagent-tank to the water to be purified before it enters the reaction-tank, substantially as and for the purposes set forth.

7. In apparatus for purifying water, the combination with a reagent-tank of a reaction-tank, means for conveying a proportionate part of the discharge from the reagent-tank to the liquid to be purified before it enters the reaction-tank and means for conveying a predetermined proportionate part of the discharge from the reagent-tank to the reaction-tank, substantially as and for the purposes set forth.

8. In apparatus for treating liquids a reagent-tank provided with a plurality of discharge-outlets and means for conducting the discharge from each of said outlets to the water to be purified at different points during its passage through the apparatus, substantially as and for the purposes set forth.

9. In apparatus for treating liquids a reagent-tank provided with a plurality of discharge-outlets and means for conducting the discharge from each of such outlets to the liquid to be purified at different points, substantially as and for the purposes set forth.

10. In apparatus for treating liquids a reagent-tank, means for dividing the reagent-discharge from such tank into separate parts and means for conducting such separate
5 parts to different destinations, substantially as and for the purposes set forth.

Signed at the city of New York, in the

county and State of New York, this 15th day of August, 1906.

HARRY HERBERT SUTRO.

Witnesses:

B. A. ITTNER,

E. QUINN.