

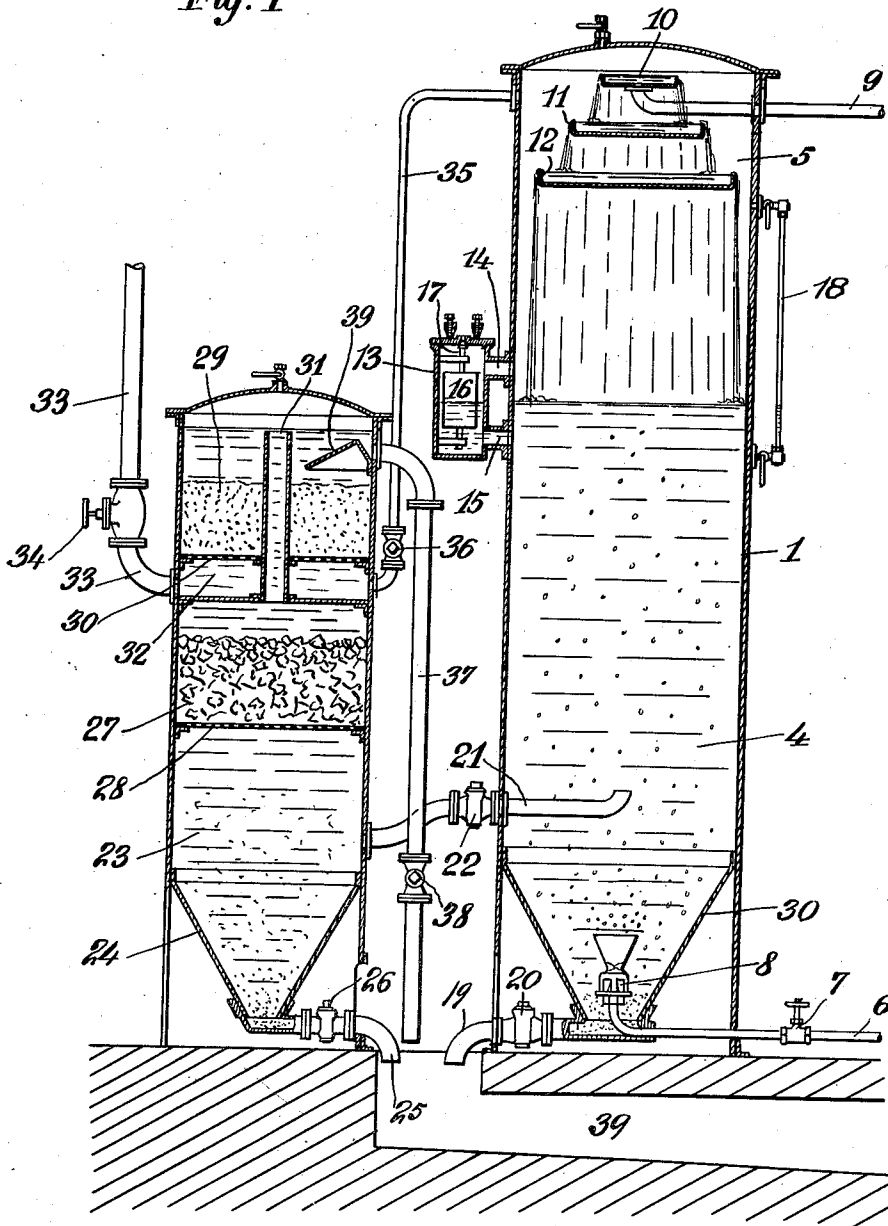
H. REISERT.
WATER PURIFYING APPARATUS.
APPLICATION FILED JUNE 8, 1909.

938,075.

Patented Oct. 26, 1909.

2 SHEETS—SHEET 1.

Fig. 1



Witnesses
W. G. Morgan
Sarah Flock.

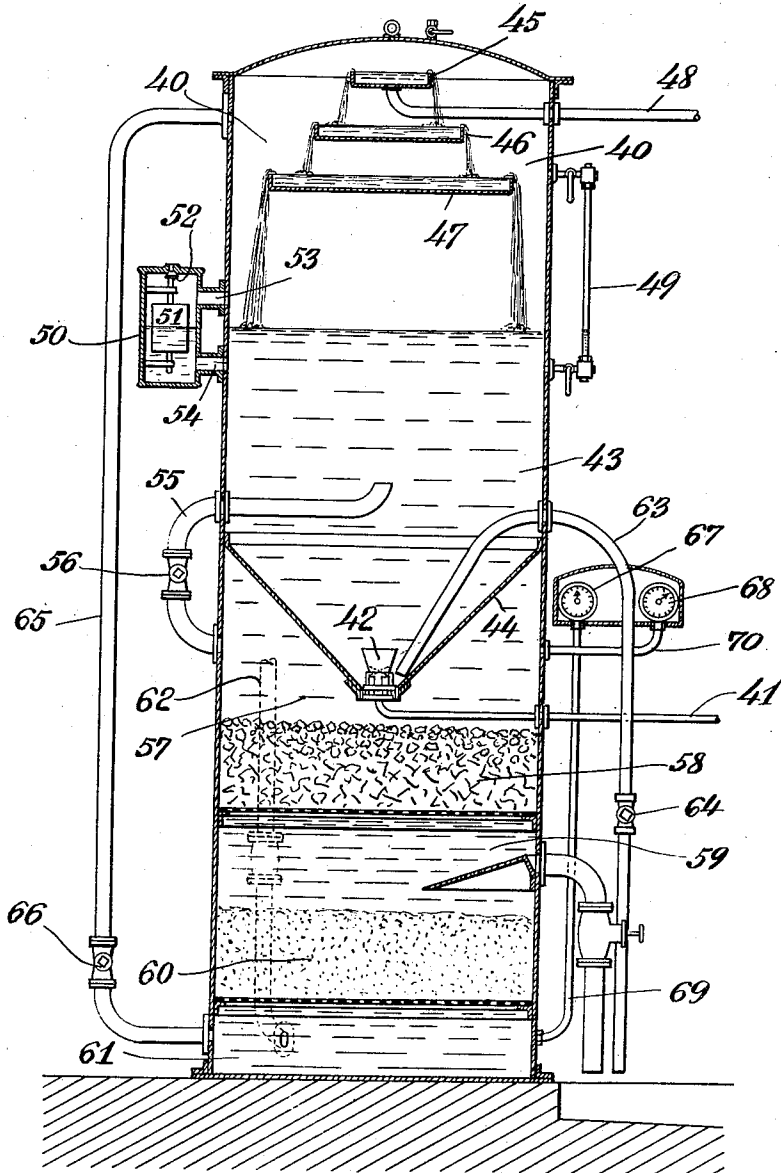
Inventor
Hans Reiser
By his Attorney W. F. Bissinger.

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2 SHEETS—SHEET 2.

Fig. 2



Witnesses
W. C. Margeson
Sarah J. Lock.

Inventor
Hans Reiser
By *W. J. Bissinger* Attorney

UNITED STATES PATENT OFFICE.

HANS REISERT, OF COLOGNE, GERMANY.

WATER-PURIFYING APPARATUS.

938,075.

Specification of Letters Patent.

Patented Oct. 26, 1909.

Application filed June 8, 1909. Serial No. 500,976.

To all whom it may concern:

Be it known that I, HANS REISERT, a citizen of the Empire of Germany, and a resident of Cologne, Germany, have invented certain new and useful Improvements in Water-Purifying Apparatus, of which the following is a specification.

Some of the objects of my invention, are, first, to provide a water-purifying apparatus wherein the ferruginous matter and analogous material carried by the water will be removed by oxidation; second, to provide a water-purifying apparatus in which the oxidation is accomplished by bringing the air under pressure into contact with the water in a finely divided state; and, third to provide means whereby the pressure and water level are regulated.

With these and other objects in view, my invention consists in the novel parts, improvements, and combinations more particularly set forth in the claims.

Referring to the accompanying drawings, which are attached to the specification and form a part thereof, Figures 1 and 2 are vertical sections of two forms of my improved water-purifying apparatus.

As shown in Fig. 1, the apparatus consists of a closed tank forming a mixing chamber 1, and provided with a conical-shaped bottom 30. The lower portion 4 of this mixing chamber is adapted to hold the water while the upper part 5 contains compressed air. Through the apex of the bottom 30, air is introduced into the mixing chamber by means of the pipe 6 provided with a valve 7 for regulating the flow of air. To the end of this pipe 6 I affix a rotary valve or nozzle 8, whereby the air, as it issues therefrom, will pass up through the water in a circular or rotary motion. Water is supplied to the chamber 1 by the pipe 9. Means are provided within the chamber 1 whereby the water as it issues from the pipe 9 will be converted into a thinly or finely divided state as it falls into the chamber. In the preferred form, said means consist of a plurality of open pans 10, 11 and 12, placed one above the other. The pipe 9 is secured to the bottom of the pan 10, so that as the water flows over the edge of this pan it will fall in a thin sheet upon the pan 11, thence in a thin sheet to pan 12, and thence in like manner into the chamber below. The pressure under which the air and water are introduced into

the mixing chamber may be so regulated that the water may be maintained at any desired level. To keep the water at such level, I provide a regulator 13, which consists of a cylinder connected to the mixing chamber 1 by two passages 14 and 15, the passage 14 communicating with the compressed air in the upper portion 5 of the chamber 1, while the passage 15 communicates with the water in the lower part 4. Within the regulator 13 is a float valve 16 and adapted, as it rises and falls, to close and open the valve 17 in the top of the regulator 12. I further provide a water-level gage 18 connected to the mixing chamber 1 to indicate the level of the water therein. When the pressure of the air in the chamber 5 increases thus lowering the water level, the float 16 falls and allows the air to escape into the atmosphere through valve 17, thus lowering the pressure within the chamber 5. The water level then rises. When the water level rises sufficiently the valve 17 is closed and the predetermined amount of air pressure keeps the water level at a fixed height. Sludge is removed from the bottom of the mixing chamber by a pipe 19 with valve 20.

In the embodiment of the invention illustrated in Fig. 1 another settling and filtering tank is provided connected with the mixing chamber by pipe 21 in which valve 22 is located. The settling tank 23 has a conical bottom 24 from which the sediment may be removed by pipe 25 and valve 26.

Two filtering tanks are preferably used,—a coarse filter 27 on a screen 28 and a fine filter 29 on a screen 30. The water passes upwardly through filter 27 by means of pipe 31 to the fine filter 29 and then downwardly through the latter filter into the pure water reservoir 32 from which it discharges by outlet pipe 33 having valve 34. Suitable means are provided for washing out the fine filter. As illustrated I make use of a pipe 35 with valve 36 leading from the air chamber 5 to the pure water reservoir 32. When the valve 36 is opened, the air carries with it some of the water in reservoir 32 upwardly through the fine filter and discharges the impurities through discharge pipe 37 having a valve 38. The air blast also stirs up the filter particles, thoroughly mixing them with the water in the tank containing the filter bed, thus cleansing them. A baffle plate 39 prevents the filtering material from reaching

the mouth of the discharge pipe. It will be observed that all three pipes 19, 25 and 37 discharge into a drain 39.

Referring now to the embodiment of the invention illustrated in Fig. 2, all the parts are contained within a single structure which economizes floor space. The air chamber 40 receives compressed air from pipe 41, rotary valve 42, the air ascending through a mixing tank 43 with conical bottom 44. Raw water is supplied to the mixing chamber by pipe 48, the water flowing over pans 45, 46, 47 to secure a complete interaction between air and water. A water level indicator 49 indicates the level of the water and a regulator 50 having a float 51 which operates air valve 52 regulates the water level. The regulator has passages 53, 54 communicating with the air chamber 40 and mixing chamber 43 respectively. A pipe 55 with valve 56 supplies the treated water to the lower filtering tank 57. The water from the mixing chamber 43 passes over the coarse filter 58, then into compartment 59 and through fine filter 60 into the pure water compartment 61 from which it discharges by means of pipe 62. The sludge is siphoned from the mixing chamber 43 by pipe 63 with valve 64. The fine filter is cleaned by purified water part of which is forced upwardly through the fine filter by compressed air supplied by pipe 65 having a valve 66 which pipe leads from the air chamber 40 into the pure water compartment 61. Suitable means are provided to indicate the condition of the filters and to determine when the washout should take place. I provide pressure gages 67 and 68 for this purpose. The pressure gage 67 by pipe 69 communicates with the far side of the filter 60 and the pressure gage 68 by pipe 70 communicates with the near side of the filter 58. When the filter clogs, it produces a greater resistance to the flow of the water through it, thus giving a greater back pressure which is indicated by the manometer 68 giving a higher indication. If the filters become clogged the manometer 67 shows a decreased pressure on the far side of the filters.

The operation of the apparatus will be clear. The raw water is intimately mingled with atmospheric air which frees it from iron and the water level and consequently the conditions of working as to pressure, height of waterfall and so forth, are kept constant and at the same time, the spraying of the water through the air occurs in a closed, high pressure system.

My invention in its broader aspects is not limited to the particular constructions and relative arrangements of the parts herein shown and described nor to any particular form of apparatus by which the invention may be carried into effect, as many changes may be made in the construction and relative

arrangement of the parts as required to adapt the apparatus to the circumstances of the particular application of the invention or to meet the personal view of the engineer employed to carry the invention into effect without departing from the main principles of the invention and without sacrificing its chief advantages.

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

1. In a water-purifying apparatus, the combination of a water reservoir, means for supplying water thereto, means for oxidizing the ferruginous materials in the water, under pressure, and an automatic regulator for decreasing the pressure when the water reaches a certain level.

2. In a water-purifying apparatus, the combination of a water reservoir, means for supplying water thereto, means for converting the water into a finely-divided state, means for oxidizing the ferruginous materials in the water under pressure, and an automatic regulator for decreasing the pressure when the water reaches a certain level.

3. In a water-purifying apparatus, the combination of a mixing chamber having a water-supply inlet and an air-inlet for supplying air thereto under pressure, means for converting the water into a finely-divided state, a settling-chamber connected with said mixing chamber and having an outlet therefrom, and an automatic regulator for decreasing the pressure when the water in the mixing chamber reaches a certain level.

4. In a water-purifying apparatus, the combination of a mixing chamber having a water-supply inlet and an air-inlet for supplying air thereto under pressure, means for converting the water into a finely-divided state, a settling-chamber connected with said mixing chamber and having an outlet therefrom,—an automatic regulator for decreasing the pressure when the water in the mixing chamber reaches a certain level and a gage for indicating the water level in said mixing chamber.

5. In a water-purifying apparatus, the combination of a mixing chamber having a water-supply inlet and an air-inlet for supplying air under pressure thereto, means for converting the water as it comes from the water inlet, into a thinly-divided state, a plurality of communicating filtering chambers, one of which is connected with said mixing chamber, a settling chamber for receiving the purified water from one of the filtering chambers, and having an outlet, and an automatic regulator for decreasing the pressure when the water in the mixing chamber has reached a certain level.

6. In a water-purifying apparatus, the combination of a mixing chamber, a water-supplying inlet, an air-inlet for supplying

air under pressure thereto, one or more pans arranged in the air compartment of the mixing chamber and adapted to receive the water after it enters the chamber so as to
5 convert it into a finely-divided state, a settling chamber connected with the mixing chamber, and an automatic regulator for decreasing the pressure when the water in the mixing chamber reaches a predetermined
10 level.

7. In a water-purifying apparatus, the combination of a mixing chamber having an air compartment and a water compartment, a water supplying inlet, an air inlet for supplying air thereto under pressure, one or
15 more pans for receiving the water as it enters the chamber for converting the water into a finely divided state, an automatic regulator including a pair of passages, one communicating with the air compartment and
20 the other with the water compartment and a valve forming part of said regulator for decreasing the pressure when the water in the mixing chamber reaches a certain level.

8. In a water-purifying apparatus, the
25 combination of a mixing chamber having an air compartment and a water compartment, a water supplying inlet, an air inlet for supplying air under pressure, one or more pans
30 for receiving the water as it enters the chamber for converting the water into a finely divided state, an automatic regulator including a pair of passages, one communicating with the air compartment and the other
35 with the water compartment, a float in the regulator, a valve actuated by said float and controlling the passage to the atmosphere for decreasing the pressure when the water
40 in the mixing chamber reaches a certain level.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

HANS REISERT.

Witnesses:

LOUIS VANDOR,
KETCH. MERZLACH.