

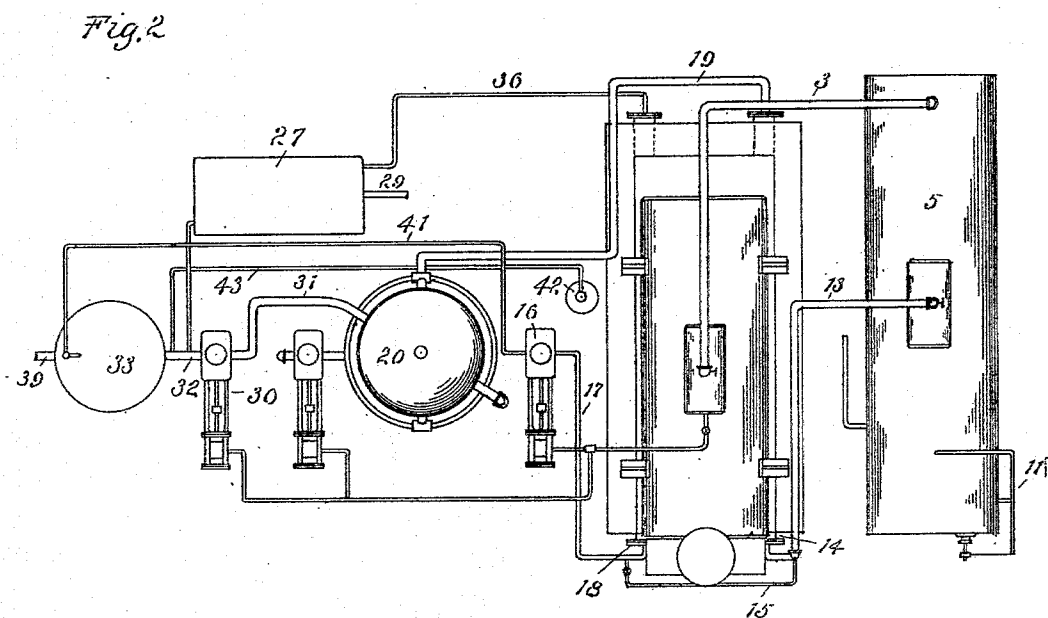
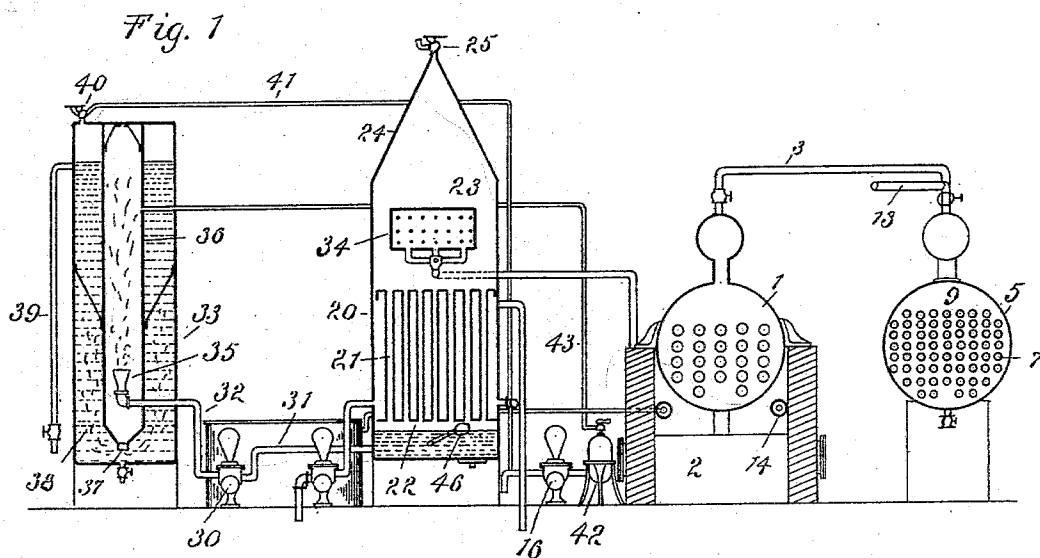
(No Model.)

2 Sheets—Sheet 1.

T. CRANEY.
APPARATUS FOR PURIFYING WATER.

No. 515,819.

Patented Mar. 6, 1894.



Witnesses
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M. B. Phelps

Inventor
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(No Model.)

2 Sheets—Sheet 2.

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Fig. 4

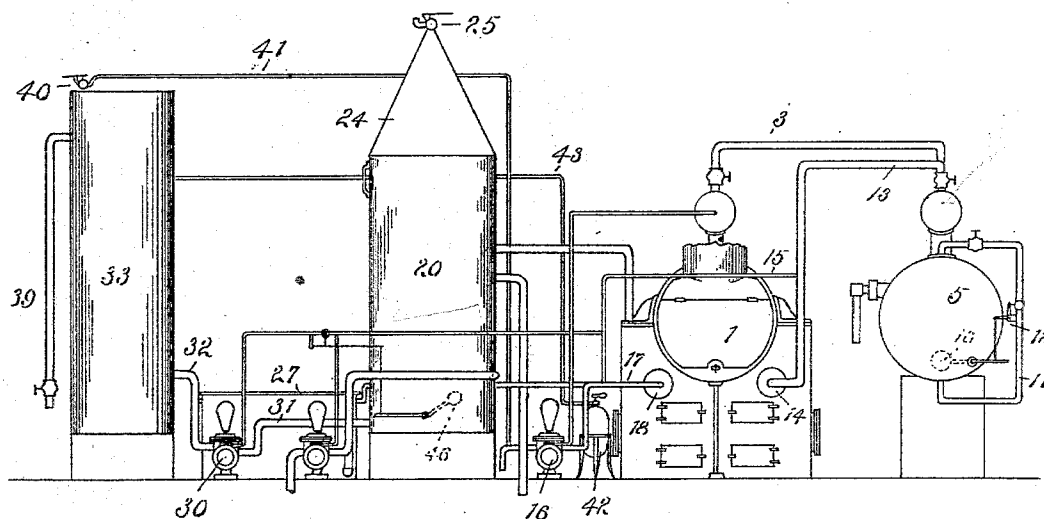
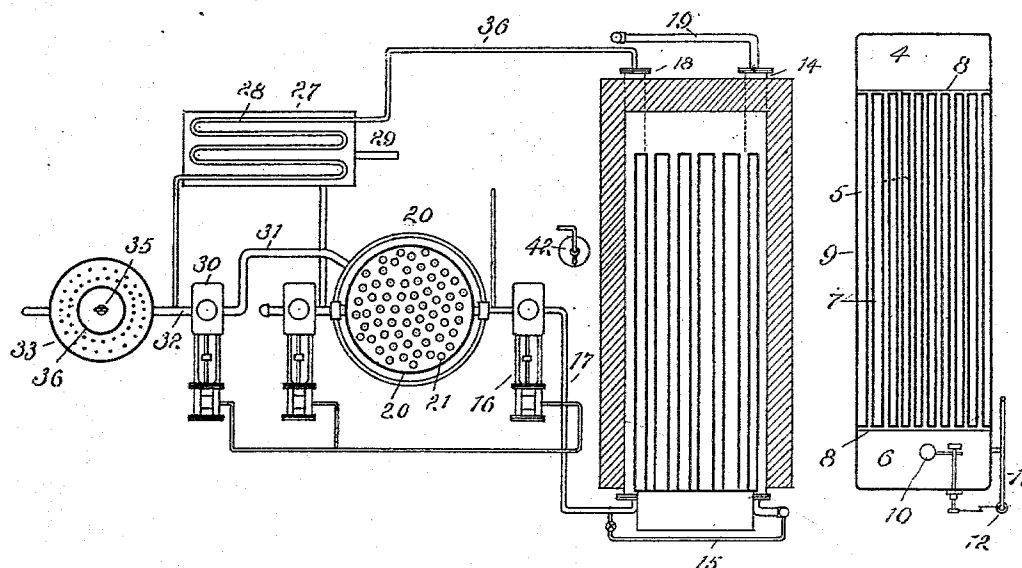


Fig. 3



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UNITED STATES PATENT OFFICE.

THOMAS CRANEY, OF BAY CITY, MICHIGAN.

APPARATUS FOR PURIFYING WATER.

SPECIFICATION forming part of Letters Patent No. 515,819, dated March 6, 1894.

Application filed June 19, 1893. Serial No. 478,186. (No model.)

To all whom it may concern:

Be it known that I, THOMAS CRANEY, a citizen of the United States, residing at Bay City, in the county of Bay and State of Michigan, have invented certain new and useful Improvements in Apparatus for Purifying Water, of which the following is a specification, reference being had therein to the accompanying drawings.

10 The invention consists in the peculiar construction of an apparatus comprising a still for purifying the same by evaporation and condensation with means for carrying off the lighter deleterious gases and the aerating apparatus in which the water may be carbonated if desired.

The invention further consists in the peculiar construction of the various parts and in the peculiar construction, arrangement 20 and combination of the various elements all as more fully hereinafter described.

In the drawings, Figure 1 is a longitudinal vertical section through the apparatus. Fig. 2 is a top plan view. Fig. 3 is a horizontal section through the apparatus and Fig. 4 is an elevation thereof.

1 is a steam generator, 2 is the furnace chamber thereof. 3 is a steam pipe extending from the steam dome thereof and entering the chamber 4 at one end of the evaporator 5. This chamber communicates with the chamber 6 at the other end through flues 7 which terminate in suitable heads 8. Around these flues and within the heads is a chamber 9.

10 is a float valve controlling the exit pipe 11 from the chamber 6, which pipe connects into the top of the chamber 9, as plainly shown in Fig. 1.

12 is the valve controlled by the float. Steam being supplied from the steam generator will enter the steam chamber in the evaporator which steam chamber comprises the chambers 4, 6 and the flues 7. The chamber 9 being filled on the start with water the steam will condense and lift the float 10 opening the valve 12, when the pressure in the steam chamber will force the water out

through the exit pipe 11 and into the chamber 9 around the flues. From the chamber 9 50 the water will be evaporated from the incoming steam, filling the flues and will find exit in the pipe 13, which leads from the top of said chamber 9. The pipe 13 leads into a retort 14 of the furnace chamber 2 of the steam 55 generator. Just before entering this retort I connect into the steam pipe 13 an air pipe 15 the mingled air and steam entering the retort together and being highly super-heated therein. Air is supplied to the air pipe by the 60 air pump 16 having the discharge pipe 17, the main portion of which enters the retort 18 in the furnace, the air pipe being a branch therefrom. From the retort the super-heated air and steam passes through the pipe 19 to the 65 condenser 20. This condenser is shown in section in Fig. 4 and consists of a casing with suitable condensing flues 21 furnished with flowing water in the usual manner, below which is the condensing chamber 22 and above 70 which is a gas chamber 23, preferably terminating in a conical top 24. The pipe 19 enters this gas chamber and discharges into a drum 34 provided with a great number of side perforations, so that all the jet effect of the 75 steam is lost and it is distributed evenly through the gas chamber 23. The steam and water being highly superheated at this point, the air and the lighter gases such as ammonia, &c., with which the water may originally have 80 been charged will rise while the aqueous vapors being heavier will fall and be condensed in the condenser 21.

The gas chamber is provided at the top with a restricted aperture or preferably with the 85 pressure relief valve 25 which allows the hot water and gases to escape therefrom. Up to this point it will be perceived that the water by distillation has been purified from the solid matter and in the condenser has been 90 purified from its gaseous impurities. I preferably use an apparatus in which the heated air is mingled with the steam as described, but I have found by super-heating the steam to a high degree and bringing it into the 95 gas chamber as described without the use of

the air that the ammoniacal gases and other lighter gases will be separated therefrom and find exit through the valve 25 without the employment of the air. The water thus purified will accumulate in the chamber 22 of the condenser and in order to be fit for drinking must be thoroughly aerated and if desired may be carbonated. To aerate it and to make sure that the air which is used is perfectly free from germs I take the air from the retort 18 through the pipe 36 and which in the retort is thoroughly sterilized. This air I preferably cool in the cooling tank 27 by passing it in a coil 28 through water therein, the water being led through the pipe 29 to the boiler. I thus not only cool down the air but also heat the feed water for the boiler.

30 is a pump having its suction 31 connected with the chamber 22 and its discharge 32 entering the tank 33. Just before entering the tank I connect the air pipe 36 into the discharge pipe 32, so that the air is mingled with the water discharged from the pump. The discharge pipe 32 terminates in the nozzle 35 in an inner aerating chamber 36 arranged within the tank 33. This chamber has a closed top and sides and has its outlet 37 at the bottom, preferably a restricted outlet. The nozzle 35 discharges upwardly and mingled air and water will be thrown in a fine spray therein and the water will be thoroughly aerated. As the spray condenses into fluid and falls to the bottom of the tank 33, the air passes through the fluid in the tank to the top thereof.

38 is a perforated screen near the bottom of the tank 33, which serves to divide the air into small globules or bubbles to more perfectly aerate the water.

39 is the overflow pipe from the tank 33.

40 is a pressure relief valve on the top of the tank 33 and which I preferably connect by means of the pipe 41 with the suction of the pump 16, so that I may use over the purified air, which escapes through the water. If it is desired to carbonate the water carbonic acid gas may be taken from a suitable tank 42 in a pipe 43 and discharged into the aerating chamber 36.

By aerating and carbonating the water in a spray under pressure I get the best possible effect and when the water passes out through the overflow 39 if the aeration alone is effected I obtain even from the foulest swamp water a satisfactory and palatable drinking water, and if the carbonating is carried on the additional benefit of a thoroughly carbonated water.

I preferably arrange a float valve 46 to control the steam supply to the pump 30.

The condenser 21 is provided with the usual air supply and overflow pipes which I do not deem it necessary to describe.

I do not herein claim the particular apparatus used in aerating the water as I intend

to make that the subject matter of another application.

What I claim as my invention is—

1. The combination with a steam generator, of an evaporator or still having a water chamber, a steam chamber within the water chamber, a connection from the steam space of the generator to the steam chamber of the evaporator, a connection from the bottom of the steam chamber of the evaporator to the water chamber thereof an exit from the top of the water chamber, a superheater for the exit and a condenser substantially as described.

2. The combination with a steam generator, an evaporator or still having a steam and water chamber, a connection from the generator to the steam chamber of the evaporator, and from the bottom of the steam chamber to the water chamber thereof, an exit pipe from the evaporator, an air pipe connecting with the exit pipe, a superheater or retort in the furnace of the generator into which the exit pipe connects, a condenser having a gas chamber at the top, a connection from the superheater to the gas chamber, and an air and gas relief at the top of the gas chamber, substantially as described.

3. In a device of the kind described, the combination of a still or evaporator, a steam supply pipe therefrom, and air pipe connecting thereto, a superheating retort a condenser having a gas chamber at the top into which the supply pipe discharges and a pressure relief port at the top of the gas chamber, substantially as described.

4. In a device of the kind described, the combination of a still or evaporator, a steam supply pipe leading therefrom, an air pipe connecting into the pipe, a superheating retort into which the pipe leads, a condenser, a gas chamber at the top of the condenser, a perforated enlarged drum in the gas chamber into which the steam pipe discharges, and a pressure relief port at the top of the gas chamber, substantially as described.

5. The combination with a steam generator, of an evaporator consisting of a casing having chambers at opposite ends, and tubular connecting passages between the chambers, a chamber surrounding the tubes, a pipe leading from a generator into the chamber at one end of the evaporator, a pipe leading from one of the end chambers and discharging into the tube-surrounding chamber, and an exit from said surrounding chamber, substantially as described.

6. The combination with a steam generator, of an aerating device, a cooling tank, an air pipe leading from the generator through the tank and into aerator, and a pipe leading from the tank into the generator, substantially as described.

7. The combination with a steam generator, of an evaporator connected therewith having

separated steam and water chambers, of a pipe leading out from the steam chamber and discharging directly into the water chamber, a valve in the pipe, means in the evaporator for actuating the valve and an exit for the water chamber, substantially as described.

5 8. In an apparatus of the kind described, the combination of a still, a super-heating chamber, a steam supply pipe leading from
o the still to the super-heating chamber, a con-

denser having a gas chamber at the top, a connection from the superheating chamber to the gas chamber, and a gas relief port in the gas chamber, substantially as described.

In testimony whereof I affix my signature in 15 presence of two witnesses.

THOMAS CRANEY.

Witnesses:

JAMES WHITTEMORE,
M. B. O'DOHERTY.