Oct. 9, 1923.

1,469,805

J. F. MUSSELMAN

HEAT EXCHANGER

Filed Aug. 8, 1921

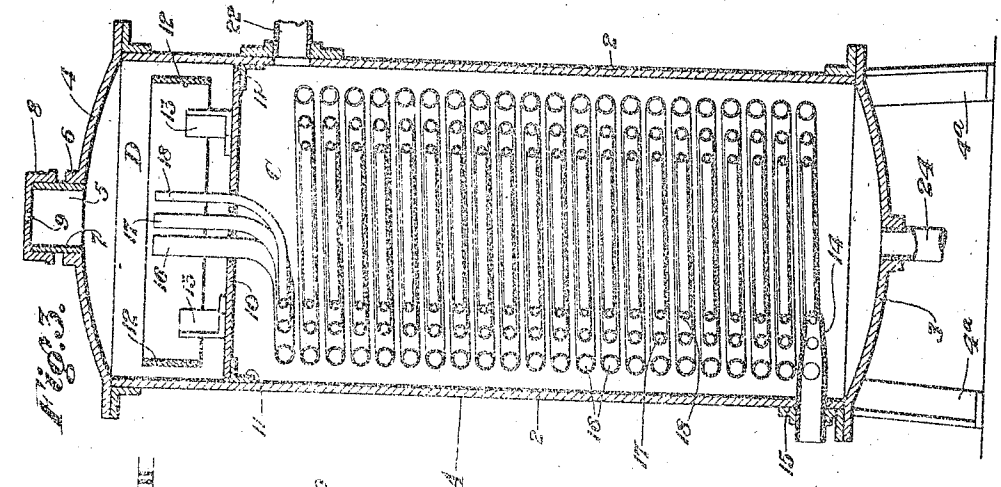


Fig. 3.

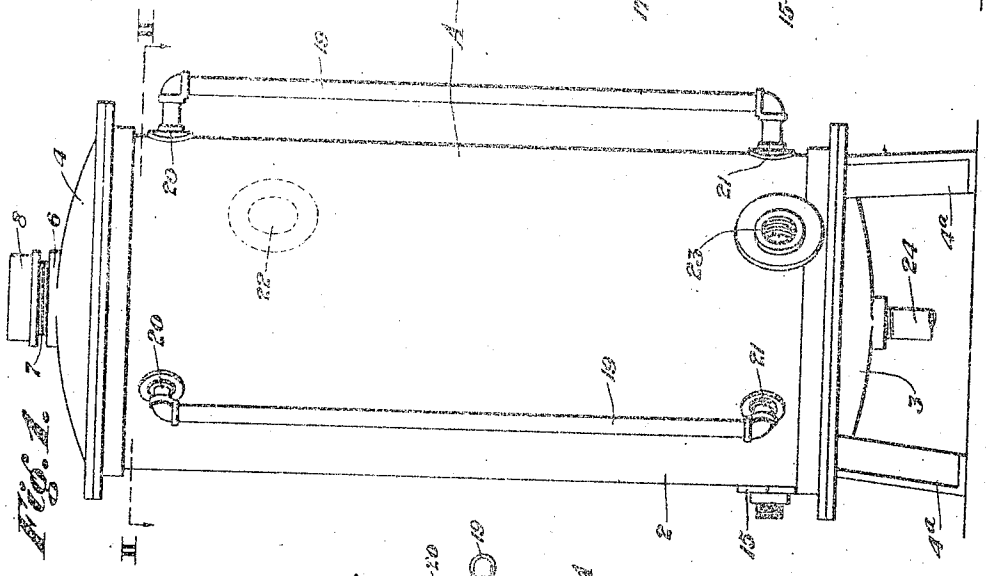


Fig. 2.

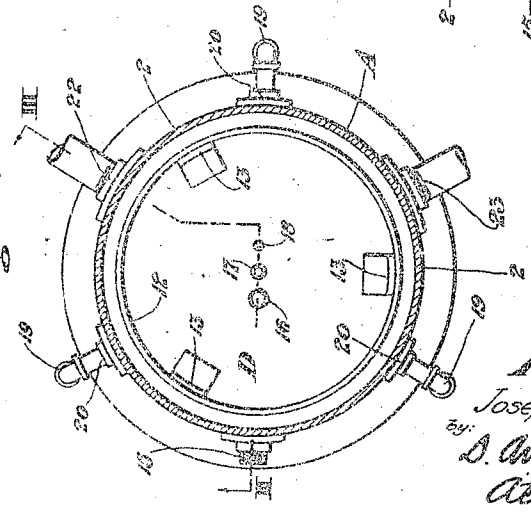


Fig. 4.

Witnesses:
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UNITED STATES PATENT OFFICE.

JOSEPH F. MUSSELMAN, OF BRONXVILLE, NEW YORK, ASSIGNOR TO ANTI CORROSION ENGINEERING COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

HEAT EXCHANGER.

Application filed August 3, 1921. Serial No. 490,540.

To all whom it may concern:

Be it known that I, JOSEPH F. MUSSELMAN, a citizen of the United States, and resident of Bronxville, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Heat Exchangers, of which the following is a specification.

My invention relates to the separation from water or similar liquid of the dissolved oxygen or other corrosive and inert gases contained therein, and more particularly to apparatus for such purpose, and has for one of its objects the provision of such apparatus having improved means for causing a continuous circulation of the water.

Another object is to provide means for baffling the water so as to more thoroughly separate the air and allow time for its escape.

Another object is to provide a tank of this class in which the water from which the corrosive and inert gases are to be separated will be subjected to a larger heating surface than in the tanks heretofore provided.

These and other objects will be more fully brought out in the following specification and claims, and illustrated in the accompanying drawings, in which:—

Figure 1 is a side elevation of the tank.

Figure 2 is a transverse section on the line II—II of Figure 1.

Figure 3 is a sectional elevation, the section being taken on the line III—III of Figure 1.

Referring to the drawings, the letter A designates the tank in general, which is composed of side walls 2, a dished bottom 3 and a top 4, and supported on legs 4^a. The top 4 is provided with a centrally arranged internally threaded aperture 5 surrounded by a shoulder 6. A nipple 7 is threaded into the aperture 5 and carries a screw threaded cap 8 provided with an air escape aperture 9.

A diaphragm 10 is loosely mounted on a plurality of spaced angle brackets 11 secured to the side walls 2 of the tank, thus dividing the tank into two portions or chambers, the lower and largest being the heat exchanging chamber C, and the upper and smaller chamber, the air separating chamber D.

A baffle ring 12 of less diameter than the tank A, is spaced above the diaphragm 10, and supported by spaced angle members 13 which are secured to the diaphragm.

A manifold member 14, having a closed inner end and a threaded outer end adapted to be connected to a source of cold water supply, is passed through the side wall 2 adjacent the lower end of the tank and is held in position by a nut 15 in threaded engagement with the threaded outer terminal.

A pluraltiy of helical coils 16, 17 and 18 are arranged within the tank A, each within the other, the coil 17 being of less diameter than the coil 16, and the coil 18 being of less diameter than the coil 17.

The coils 16, 17, and 18 have their bottom terminals connected to the cold water manifold 14 and their upper terminals extend upwardly through loose fitting apertures formed in approximately the center of the diaphragm 10 to approximately the top of the baffle ring 12 which marks the water level.

A plurality of circulation pipes 19 are arranged on the outside of the tank A, and have their upper ends communicating with the separating chamber D, through inlets 20, and their lower ends connecting with the lower portion of the heat exchanging chamber C, through inlet 21.

Hot water enters the heat exchanging chamber C of the tank A, through an inlet 22 arranged adjacent the top of said chamber, and adapted to be connected to a hot water supply (not shown).

A hot water outlet 23 is provided adjacent the bottom of the heat exchanger chamber C through which the hot water passes to a suitable circulating system (not shown). The water from the chamber C is adapted to flow through the circulating system and return to a heater (not shown) which forms the source of supply of hot water for the in-

let 22. However, any other system of circulating the water from the outlet 23, through a heater, and returning it to the hot water inlet 22, may be used.

A second outlet pipe 24 is connected with a centrally arranged aperture in the bottom 3 to provide for total drainage of the tank when desired.

The operation of the apparatus when connected in a system is as follows:—Hot water is supplied to the tank through the hot water inlet 22, and flows out to the circulating system (not shown) through the outlet 23.

Cold water enters the manifold 14 from a source (not shown) and passes upwardly through the coils 16, 17, and 18, becoming heated by absorbing heat from the hot water in the tank, and as the water flows upwardly, the air naturally contained in it is progressively freed from solution in the water in the form of fine bubbles. During the course of upward travel of the water, these bubbles have a tendency to be thrown outwardly, due to centrifugal force caused by the travel through the coils, and they unite forming larger bubbles which break upon reaching the chamber D. The water after it reaches the chamber D is baffled by the baffle ring 12, thus allowing it to remain within the chamber a sufficient length of time to permit the air to escape. The water in the two chambers C and D is continuously circulated through the pipes 19, the baffle 12 serving to break up the body of water in the chamber D, and prevent the formation of circulation eddies or zones.

It will be readily apparent from the above description that I have provided an improved apparatus that will more thoroughly separate the corrosive and inert gases from water than those heretofore constructed, and one that will have a more efficient water circulation.

While I have shown and described one particular form of tank it will be readily apparent to those skilled in the art that various changes in design and combination of parts may be made within the scope of the appended claims without departing from the spirit of my invention. For instance, any number of coils may be employed, or the diaphragm 10 may be rigidly secured in place, and the various parts may be assembled and secured in other ways than described.

I claim:—

1. In a tank of the class described, a diaphragm for dividing said tank into upper and lower chambers, said lower chamber being provided with hot water inlet and outlet ports for causing a circulation of hot water therethrough, at least one helical coil within said lower chamber adapted to be connected to a cold water supply and terminating in said upper chamber, and means for causing a circulation between said chambers.

2. In a tank of the class described, a diaphragm for dividing said tank into upper and lower chambers, said lower chamber being provided with hot water inlet and outlet ports for causing a circulation of hot water therethrough, at least one helical coil within said lower chamber adapted to be connected to a cold water supply and terminating in said upper chamber, and at least one circulation pipe extending along said tank and communicating with both of said chambers.

3. In a tank of the class described, a diaphragm for dividing said tank into upper and lower chambers, said lower chamber being provided with hot water inlet and outlet ports for causing a circulation of hot water therethrough, a plurality of helical coils within said lower chamber adapted to have their lower ends connected by a suitable manifold to a cold water supply, said coils passing upwardly through approximately the center of said diaphragm and having their upper ends terminating within said upper chamber, and a plurality of circulation pipes extending along the sides of said tank in suitable spaced relation and having their ends terminating in and communicating with said upper and lower chambers.

4. In a tank of the class described, a diaphragm for dividing said tank into upper and lower chambers, said lower chamber being provided with hot water inlet and outlet ports for causing a circulation of hot water therethrough, at least one helical coil within said lower chamber adapted to be connected to a cold water supply and terminating in said upper chamber, means for causing a circulation between said chambers, and means for baffling the water within said upper chamber to prevent the formation of circulation eddies and zones.

5. In a tank of the class described, a diaphragm for dividing said tank into upper and lower chambers, said lower chamber being provided with hot water inlet and outlet ports for causing a circulation of hot water therethrough, at least one helical coil within said lower chamber adapted to be connected to a cold water supply and terminating in said upper chamber, means for causing a circulation between said chambers, and a baffle ring within said upper chamber adapted to baffle and break up the water therein to prevent the formation of circulation eddies and zones.

6. In a tank of the class described, a diaphragm for dividing said tank into upper and lower chambers, said lower chamber being provided with hot water inlet and outlet ports for causing a circulation of hot water therethrough, at least one helical coil within said lower chamber adapted to be connected to a cold water supply and termi-

nating in said upper chamber, a plurality of pipes extending along the sides of said tank having their ends terminating in, and communicating with, said upper and lower chambers to provide for circulation therebetween, and a baffle ring supported on said diaphragm within said upper chamber adapted to baffle the water and prevent the formation of circulation eddies and zones.

In testimony whereof, I have hereunto signed my name.

JOSEPH F. MUSSELMAN.