H. A. YOUNG.

VACUUM PRODUCING AND BOILER FEEDING APPARATUS.

APPLICATION FILED OCT. 28, 1921.

1,438,008. Patented Dec. 5, 1922.

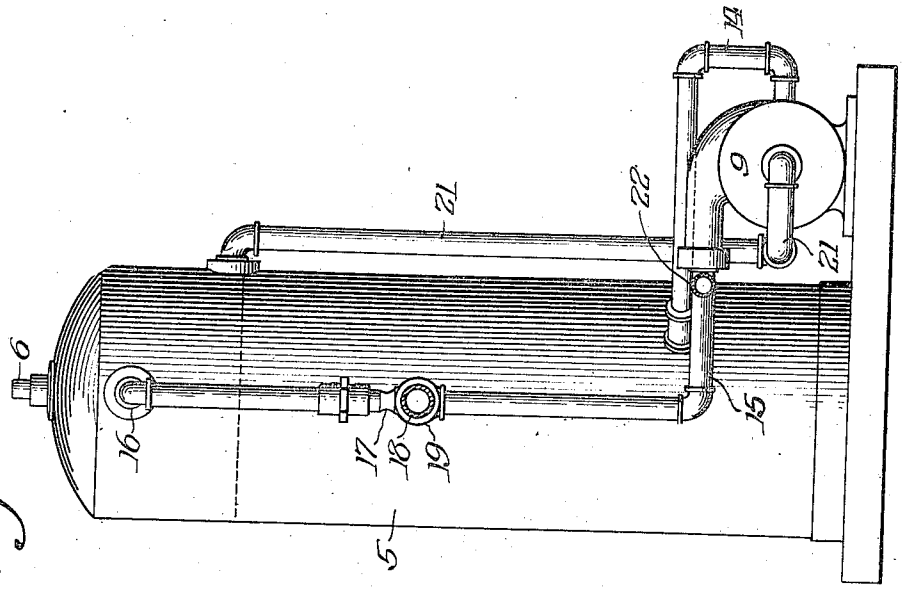


Fig. 2.

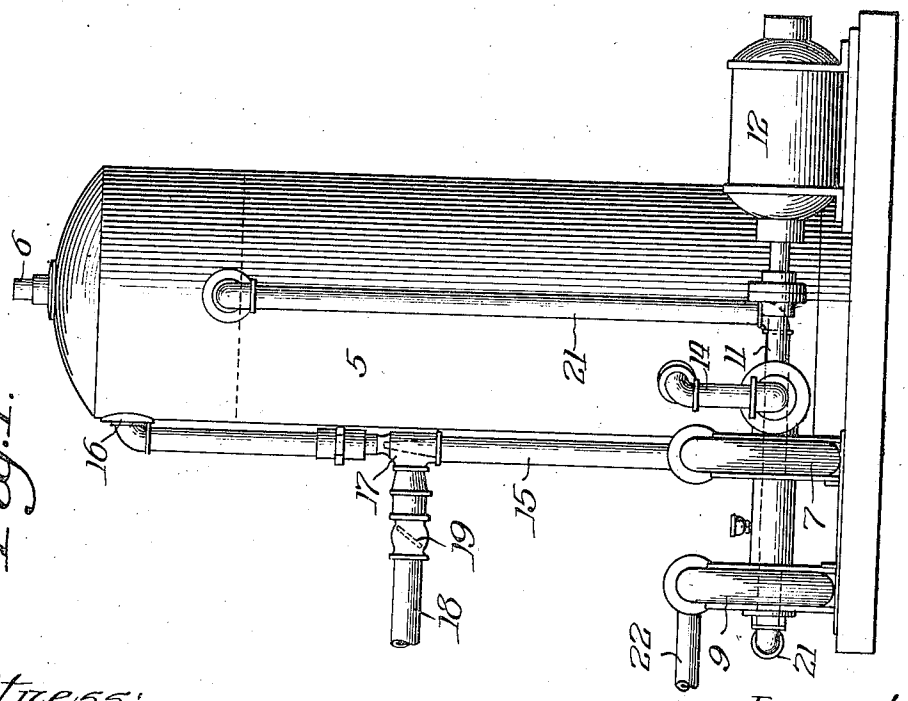


Fig. 1.

Witness:
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UNITED STATES PATENT OFFICE.

HOWARD A. YOUNG, OF CHICAGO, ILLINOIS.

VACUUM-PRODUCING AND BOILER-FEEDING APPARATUS.

Application filed October 28, 1921. Serial No. 511,157.

To all whom it may concern:

Be it known that I, HOWARD A. YOUNG, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Vacuum-Producing and Boiler-Feeding Apparatus, of which the following is a specification.

This invention relates to vacuum producing apparatus, by which gases, air, and water of condensation are withdrawn from a heating system, and my present invention also makes provision for the delivery of the water of condensation taken from the heating system into a boiler, feed water heater or other apparatus, which is generally under pressure. In my prior application Serial No. 440,403, filed January 27, 1921, I disclosed an apparatus for accomplishing a similar purpose, but in that apparatus, a float controlled valve was utilized for controlling the delivery of the water of condensation from the tank in which it was collected from the heating system into the boiler or other apparatus.

My present invention constitutes an improvement upon the apparatus disclosed in the application above referred to in that it provides a simpler and more economical apparatus, and obviates the use of the control valve above mentioned and the float mechanism associated therewith, thereby diminishing the number of operating parts, and correspondingly increasing the reliability of the apparatus.

For the purpose of facilitating an understanding of my invention, I have illustrated one preferred embodiment thereof on the accompanying drawings, from an inspection of which, when considered in connection with the following description, the principles of my invention and many of its inherent advantages should be readily understood and appreciated.

Referring to the drawings:

Fig. 1 is a side view of an apparatus embodying my invention; and

Fig. 2 is a similar view at right angles to Fig. 1.

By reference to the drawings, it will be observed that my apparatus comprises a tank 5 adapted to receive air, gases, and water of condensation from a heating system, the tank being provided at its top with a vent 6 through which the air and gases escape to the atmosphere, while the liquids withdrawn from the heating system are trapped in the tank.

A centrifugal pump 7 is mounted with its axis of rotation horizontally disposed near the bottom of the tank upon a suitable support, and co-axially therewith and at one side of the pump 7 there is mounted a similar pump 9, both pumps being attached to and driven by a shaft 11 directly connected to an electric driving motor 12. The pump 7 is connected with the lower portion of the tank by an inlet pipe 14 and the discharge pipe 15 leading therefrom delivers at 16 into the tank near the top thereof. A vacuum producing device 17 comprising an injector is interposed in the pipe 15 and its suction side is connected with the return pipe 18 of a steam heating system, this pipe being equipped with a check valve 19 to prevent reverse flow through the pipe should a partial vacuum be formed in the heating system by condensation or otherwise.

The pump 7 being continuously operated, withdraws water from the lower portion of the tank and returns it to the upper portion, the water in its passage through the injector 17 creating a partial vacuum which withdraws the air, gases, and water of condensation from the return line 18 and delivers them into the tank 5.

Since the water of condensation collects in considerable quantities in the tank, particularly in large heating systems, it will be manifest that the water level in the tank will gradually rise from this accumulation of condensation water, and for the purpose of conserving this water and the heat units contained therein, I have provided mechanism for returning it to the boiler, or other apparatus, where it becomes available for use.

The pump 9 is utilized for this purpose and it receives its supply of water through an intake pipe 21, which communicates with the interior of the tank at the height of the desired maximum water level therein. The water delivered by the pump is discharged through a delivery pipe 22 into the boiler, or other apparatus, this pipe being preferably equipped with a check valve (not shown) to prevent reverse flow through the pipe under pressure of the boiler.

Both of the pumps 7 and 9 are continuously operated, and pump 7 being disposed beneath the water level in the tank, is continuously submerged and primed. The pump

9, however, is not continuously submerged, and if this pump had its discharge vertically disposed, air would be trapped in the upper portion of the pump casing, which would render the pump inoperative. Such trapping of the air is obviated in my present invention by mounting the discharge nozzle of the pump horizontally so that the pump in this position is adapted to deliver such water as is fed to it irrespective of whether the water comes in maximum quantities equal to the capacity of the pipe 21 or whether it overflows from the tank 5 in much lesser quantities. By mounting the pump in this manner, I am therefore enabled to dispense with the valve and float mechanism, which were essential to the apparatus disclosed in my prior application. The cost of manufacture and installation of the apparatus is therefore materially reduced, and obviously, its reliability is correspondingly increased since all danger of sticking valves or punctured floats is eliminated.

My invention and its attendant advantages should be understood without further description, and it should be manifest that the structural details attendant upon the embodiment of the invention may be varied within wide limits without exceeding the scope of the invention as defined in the following claims.

I claim:

1. In an apparatus of the character described, the combination of a tank, means for delivering gases and water of condensation from a heating system to said tank, a surplus water delivery pump adapted to be connected with a boiler or the like, and means for establishing communication between said pump and the interior of the tank at the height of the desired maximum water level therein.

2. In an apparatus of the character described, the combination of a tank, means for delivering gases and water of condensation from a heating system to said tank, a centrifugal pump, and a pipe establishing continuous communication between said pump and the interior of said tank at the desired water level therein.

3. In an apparatus of the character described, the combination of a tank open to atmosphere, means for supplying water thereto, a centrifugal pump provided with a horizontal discharge, and a supply pipe for said pump communicating with the pump and with the interior of the tank at the maximum water level therein through which water flows from said tank to said pump when said level is reached.

4. In an apparatus of the character described, the combination of a tank, means for delivering water of condensation from a heating system to said tank, and means for delivering said water collected in the tank to a boiler or the like, said means comprising a centrifugal pump provided with a horizontal outlet, and a supply pipe therefor connected with said tank at the maximum desired water level therein.

HOWARD A. YOUNG.