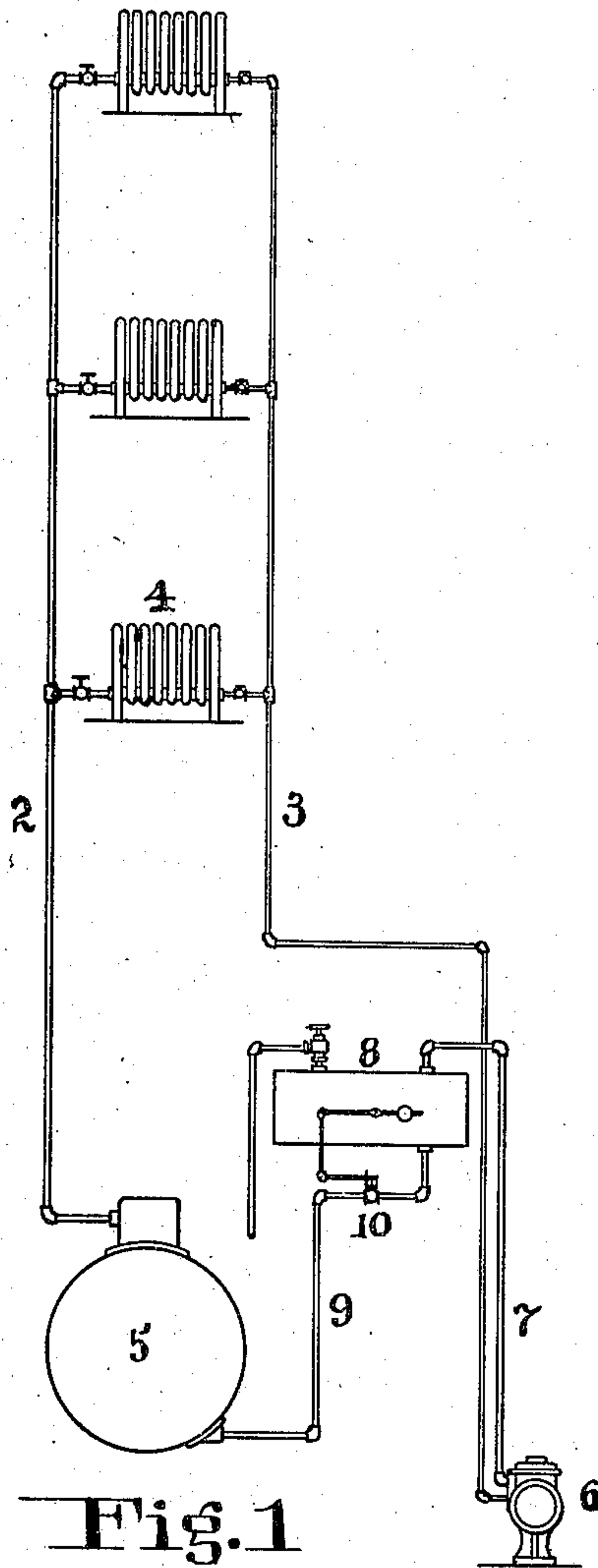
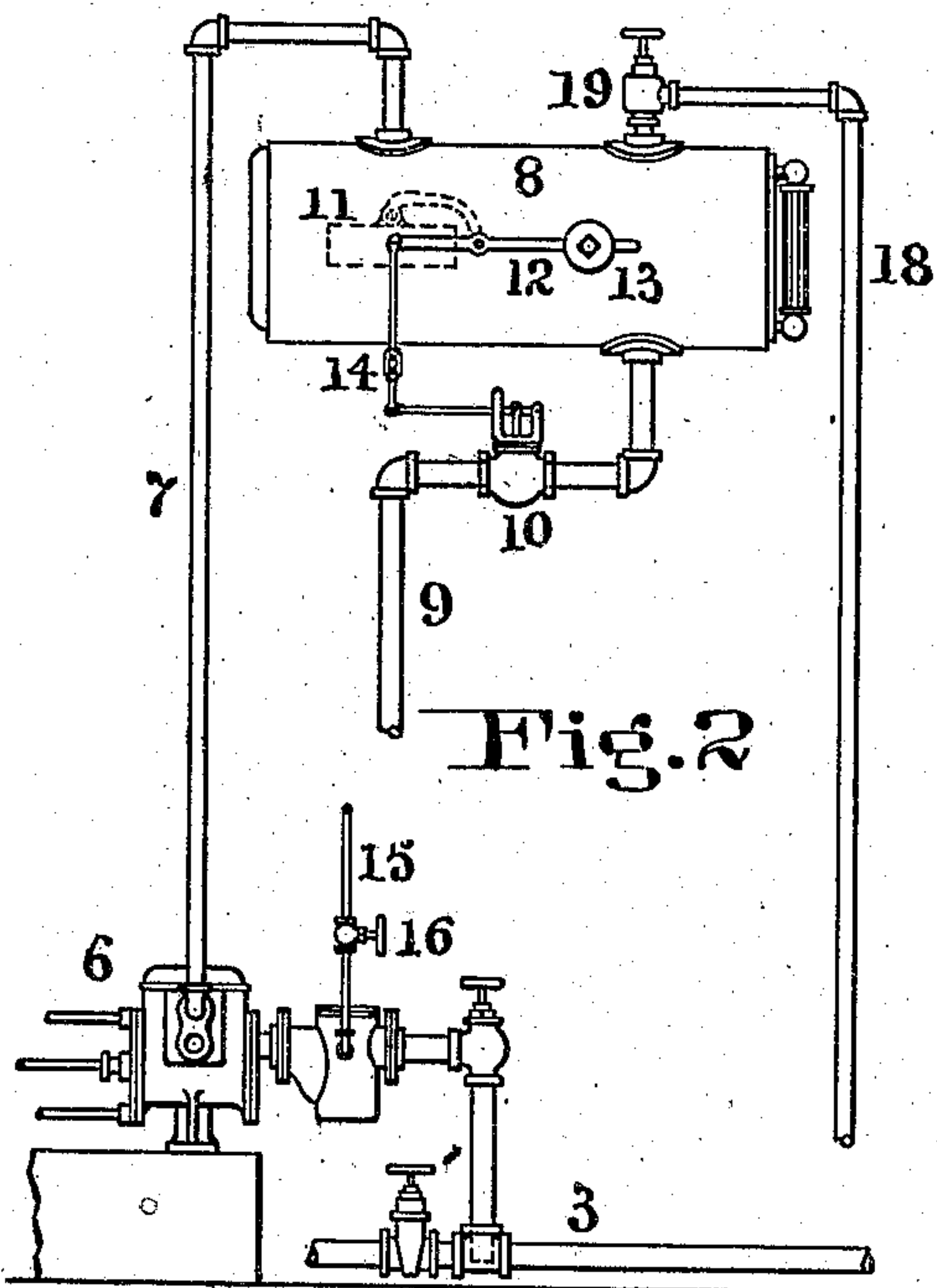
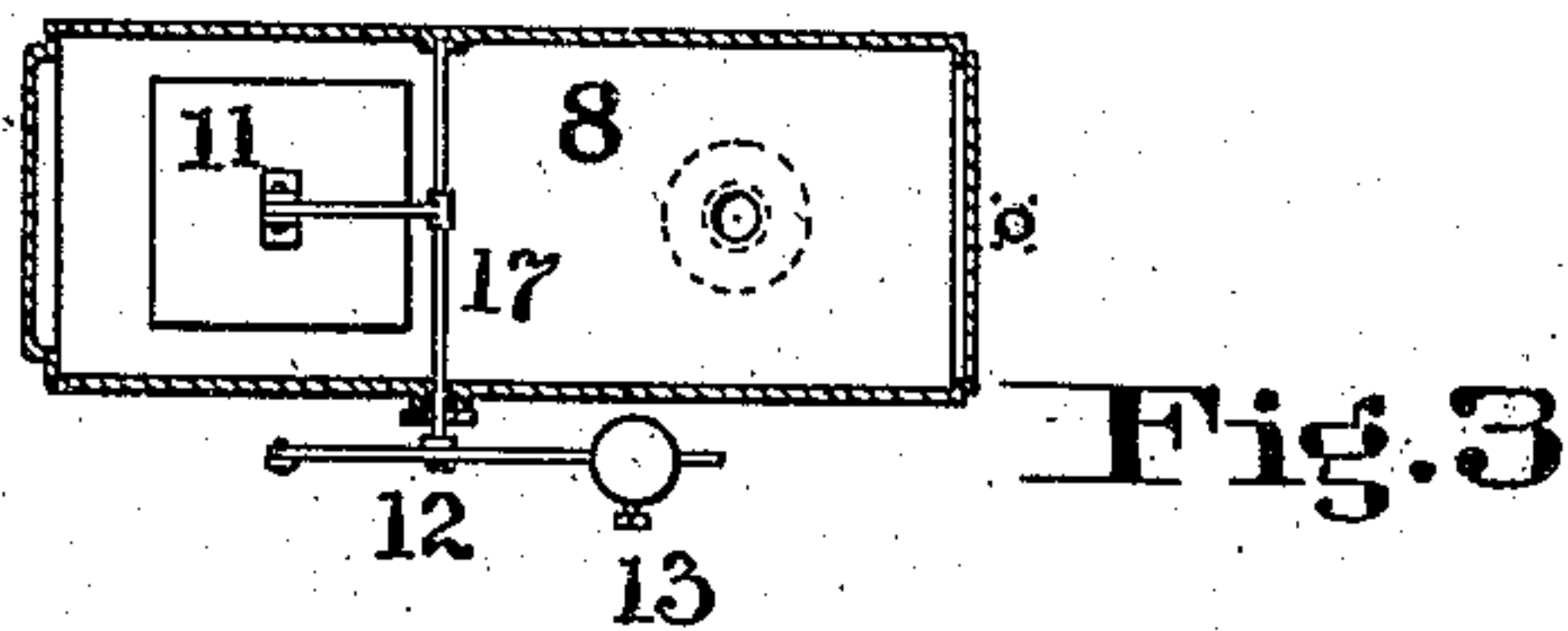
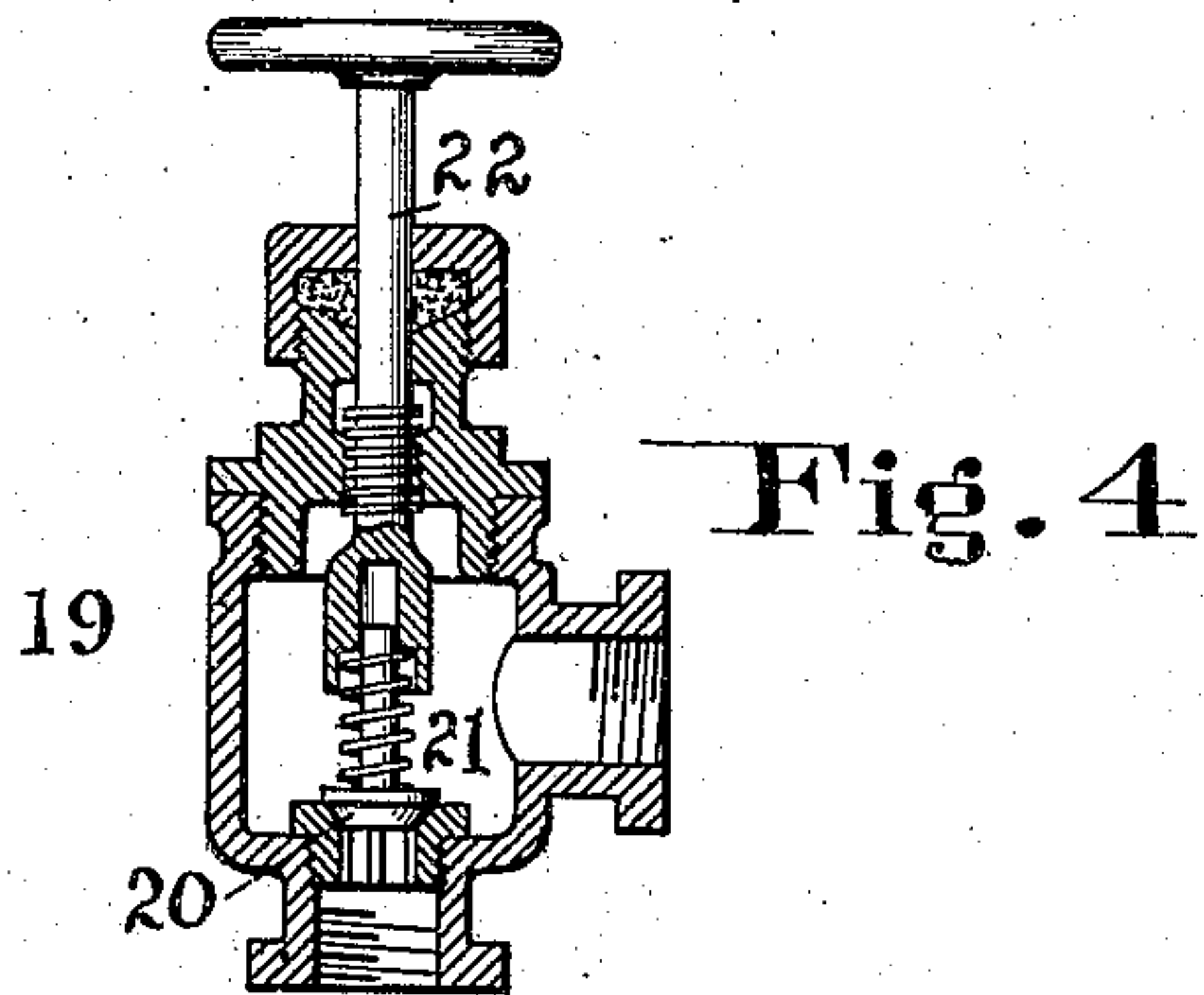


M. P. OSBOURN.
STEAM HEATING APPARATUS.
APPLICATION FILED JUNE 4, 1908.

911,751.

Patented Feb. 9, 1909.



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UNITED STATES PATENT OFFICE.

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STEAM-HEATING APPARATUS.

No. 911,751.

Specification of Letters Patent.

Patented Feb. 9, 1909.

Application filed June 4, 1908. Serial No. 436,535.

To all whom it may concern:

Be it known that I, MILLARD P. OSBOURN, a citizen of the United States, and resident of Merchantville, Camden county, State of New Jersey, have invented an Improvement in Steam-Heating Apparatus, of which the following is a specification.

My invention has reference to steam heating apparatus, and consists of certain improvements which are fully set forth in the following specification and shown in the accompanying drawings which form a part thereof.

In vacuum systems of steam heating the water of condensation from the returns is discharged into a receiving tank by the vacuum pump and usually returned therefrom directly or by means of a boiler feed pump to the boiler.

The object of my present invention is to provide automatic means for preserving within the receiving tank a pressure below a predetermined amount, by permitting escape of all accumulations of air from the tank which cause an excess thereof, and likewise permitting an automatic discharge of the accumulation of water of condensation in such degree as to restore a normal level in the tank in case of excessive rise in the water level thereof, said water being discharged under the pressure existing in the tank and delivered into the boiler or other place of delivery, as may be required.

By my invention, I am enabled to provide an adequate air pressure, through the agency of the vacuum pump, which may be utilized in place of a hydrostatic pressure heretofore secured by placing the receiving tank at a considerable elevation, to provide a pressure in the receiving tank capable of delivering the water against the pressure existing in the steam boiler, a result most useful when, from structural difficulties of the building, the receiving tank must be located in the basement, approximately on a level with the boiler.

My invention consists of a heating system having a vacuum pump for withdrawing the air, and water if desired, from the system, combined with a closed receiving tank for water and air, a regulated escape or relief valve for air to relieve the pressure within the tank when it exceeds a predetermined amount, a valved discharge pipe from the lower portion of the tank for water, and a

float or other device controlled by variation in the level of the water within the tank to regulate the discharge of the water into the boiler or other place of reception.

My invention also comprehends details of construction which, together with the features above set forth, will be better understood by reference to the drawings, in which—

Figure 1, is a diagram illustrating a steam heating system embodying my invention; Fig. 2 is an elevation of a portion of the steam heating apparatus on a larger scale; Fig. 3 is a sectional plan view through the receiving tank; and Fig. 4 is a sectional elevation of the adjustable pressure relief valve.

2 is a steam supply pipe leading from a boiler 5, for supplying steam to the radiators, indicated at 4. The water of condensation and air passes from the radiators into the return pipe 3, which leads down to the vacuum pump 6, said vacuum pump discharging by pipe 7 into a closed receiving tank 8. Ordinarily, the return pipe 3, is connected with the vacuum pump 6, through a suitable strainer, and any vapors or steam may be condensed by a jet of water from a pipe, 15 having a regulating valve 16. The general system above outlined may be of any ordinary construction.

The water of condensation, received in the receiving tank 8 from the vacuum pump 6, is returned to the boiler 5 by a pipe 9 which connects with the lower part of the tank 8, and is provided with a discharge valve 10. This discharge valve 10 is connected by an adjustable link 14 with the lever 12 which may be counterweighted, as at 13. This lever is secured to the rock shaft 17, which extends through a suitable box into the interior of the receiving tank 8. The rock shaft 17 is connected with a float 11 within the tank so that the variation in the level of the water within the said tank will cause the float to rise or fall and rock the lever 12, to open or close the discharge valve 10. It will thus be seen that, if the level of the water within the tank 8 rises above the predetermined level, the discharge valve 10 will be opened to permit the water to pass from the tank 8 through the pipe 9 into the boiler. By this means, all excessive quantities of water delivered within the tank 8 by the pipe 7, are caused to be automatically discharged through the valve 10.

The vacuum pump 6 discharges both air and water into the tank 8, and the air being elastic provides an air pressure above the water within the tank, which pressure is regulated by the valve 19 to be a maximum sufficient to insure the discharge of the water from the tank 8 into the boiler 5 against the pressure within said boiler.

The construction of the valve 19 is illustrated in Fig. 4, and consists of a valve piece 20, which is pressed down upon its seat by spring 21. The pressure of this spring may be varied by the adjustment of the screw stem 22. Whenever the pressure in the tank becomes greater than the pressure of the spring 21, acting upon the valve piece 20, the latter will be raised to permit an escape of the air from the tank until the normal maximum pressure therein is regained, when the valve piece 20 again seats itself, and maintains the pressure desired within the tank. This valve 19, discharges by pipe 18 to the atmosphere or sewer. By adjusting the screw stem 22, the pressure within the tank 8 may be maintained at any pressure desired, said regulation being largely dependent upon the pressure of the boiler to be overcome.

By the construction herein shown, I am enabled to locate the receiving tank 8 in the basement, or on substantially the level of the boiler, instead of locating the receiver at a high elevation, and depending upon the static head of water as a means of obtaining the pressure for insuring the feeding of the water to the boiler against the boiler pressure, the advantage of my construction being the compactness of the apparatus and wholly obviating the necessity of finding space in the upper floors of the building for the receiving tank. I further secure the advantage of being able to vary the discharge pressure in the tank to suit any change in the boiler pressure found desirable or necessary to suit the conditions of steam circulation.

I have shown my apparatus in the form which I have found it most excellently adapted for commercial use, but it is evident that the details may be modified in various ways so long as automatic means are provided for maintaining a constant air pressure within the receiving tank, and the discharge of the water from the receiving tank is controlled by the level of the water within the tank.

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

1. In a steam heating system, the combination of steam heating apparatus combined with a return pipe, a pump connected with the return pipe, a closed receiving tank, a pipe connecting the pump with the receiving tank for discharging therein water of con-

densation and air from the heating apparatus, a relief valve on the receiving tank for limiting the pressure therein, a discharge pipe from the tank for the water, means controlled by the water within the tank to permit the discharge of the water when an excessive accumulation thereof takes place within the tank.

2. In a steam heating system, the combination of steam heating apparatus combined with a return pipe, a pump connected with the return pipe, a closed receiving tank, a pipe connecting the pump with the receiving tank for discharging therein water of condensation and air from the heating apparatus, a relief valve on the receiving tank for limiting the pressure therein, a discharge pipe from the tank for the water, means controlled by the water within the tank to permit the discharge of the water when an excessive accumulation thereof takes place within the tank, a boiler to supply steam to the heating apparatus, and a connection between the discharge pipe and the boiler whereby the water discharged from the receiving tank is delivered into the boiler against the boiler pressure.

3. In a steam heating system, the combination of steam heating apparatus combined with a return pipe, a pump connected with the return pipe, a closed receiving tank, a pipe connecting the pump with the receiving tank for discharging therein water of condensation and air from the heating apparatus, an adjustable relief valve on the receiving tank for limiting the pressure therein and whereby the normal maximum pressure within the receiving tank may be varied, a discharge pipe from the tank for the water, means controlled by the water within the tank to permit the discharge of the water when an excessive accumulation thereof takes place within the tank.

4. In a steam heating system, the combination of steam heating apparatus combined with a return pipe, a pump connected with the return pipe, a closed receiving tank, a pipe connecting the pump with the receiving tank for discharging therein water of condensation and air from the heating apparatus, a relief valve on the receiving tank for limiting the pressure therein, a discharge pipe from the tank for the water, means controlled by the water within the tank to permit the discharge of the water when an excessive accumulation thereof takes place within the tank consisting of a valve, lever mechanism to open or close the valve and a float for operating the lever mechanism.

5. In a steam heating system the combination of the return pipe, a vacuum pump connected therewith, a closed receiving tank into which the vacuum pump discharges, a valved discharge pipe leading

from the receiving tank through which water is discharged by the pressure in the tank produced by the pump, and float actuated mechanism controlled by the level of the water in the receiving tank for operating the valve of the discharge pipe.

6. In a steam heating system the combination of the return pipe, a vacuum pump connected therewith, a closed receiving tank into which the vacuum pump discharges under pressure, means for relieving excessive pressure within the receiving tank, a valved discharge pipe leading from the receiving tank through which water is discharged by the pressure in the tank produced by the pump, and float actuated mechanism controlled by the level of the water in the receiving tank for operating the valve of the discharge pipe.

7. In a steam heating system the combination of the return pipe, a vacuum pump connected therewith, a closed receiving tank into which the vacuum pump discharges, means for maintaining a pressure within the receiving tank, means for adjusting the maximum limit of the pressure, a valved discharge pipe leading from the receiving tank through which water is discharged by the pressure in the tank produced by the pump, and float actuated mechanism con-

trolled by the level of the water in the receiving tank for operating the valve of the discharge pipe.

8. In a steam heating system, the combination of a boiler, heating devices supplied with steam from the boiler and provided with a return pipe, a vacuum pump connected with the return pipe for maintaining a partial vacuum therein, and automatic means interposed between the discharge of the vacuum pump and the boiler for delivering the water of condensation intermittently to the boiler against the boiler pressure whenever said water of condensation accumulates consisting of a tank into which the water of condensation is pumped and from which the water flows to the boiler and normally under greater pressure than the boiler pressure, and means controlled by the level of the water in the tank to control the flow of the water from the tank to the boiler without the intervention of a pump.

In testimony of which invention, I have hereunto set my hand.

MILLARD P. OSBOURN.

Witnesses:

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T. M. BRUSTER.