No. 694,206. Patented Feb. 25, 1902.

# I. D. SMEAD.

## HOT WATER HEATING SYSTEM.

(Application filed Oct. 12, 1901.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

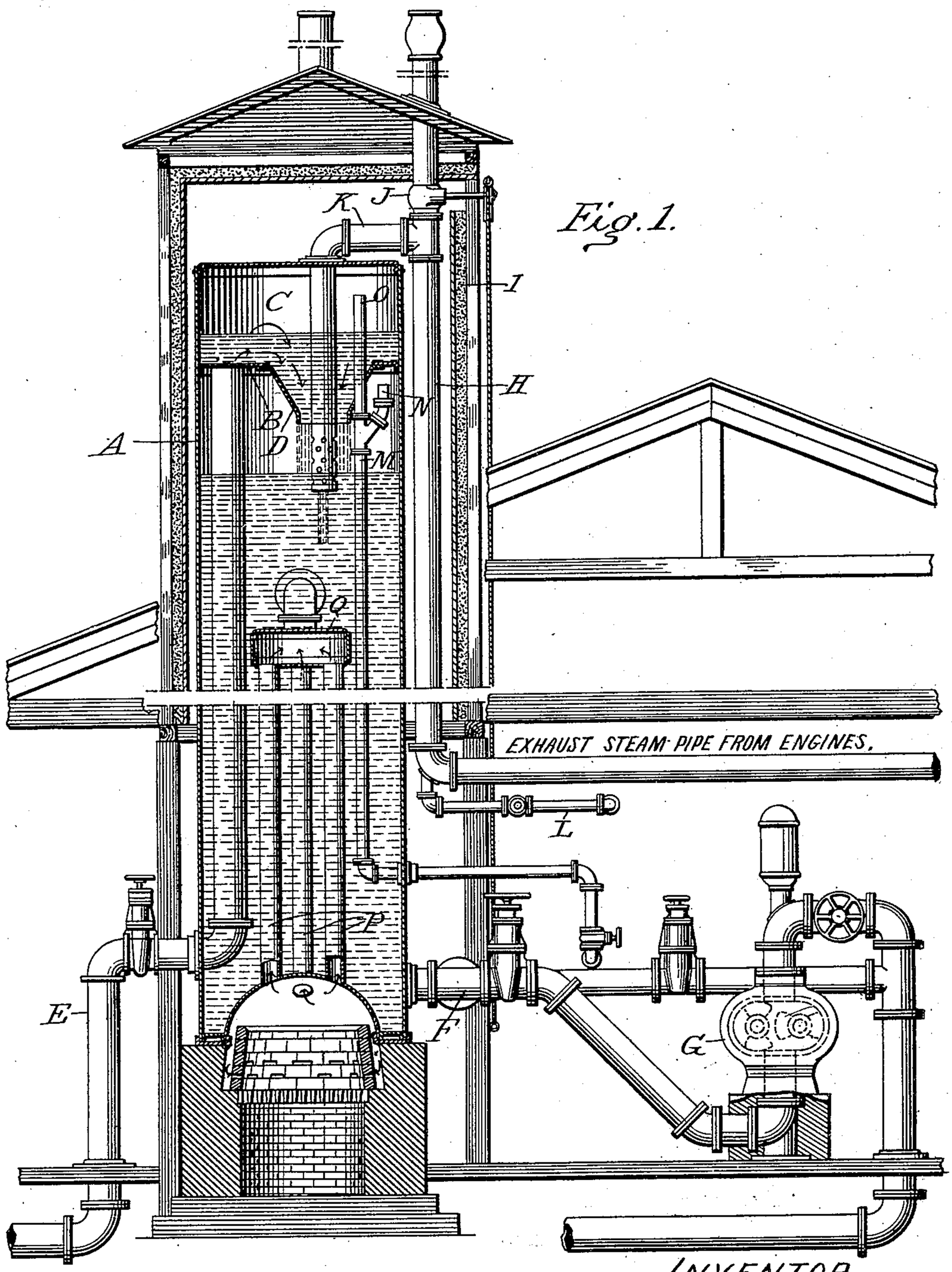


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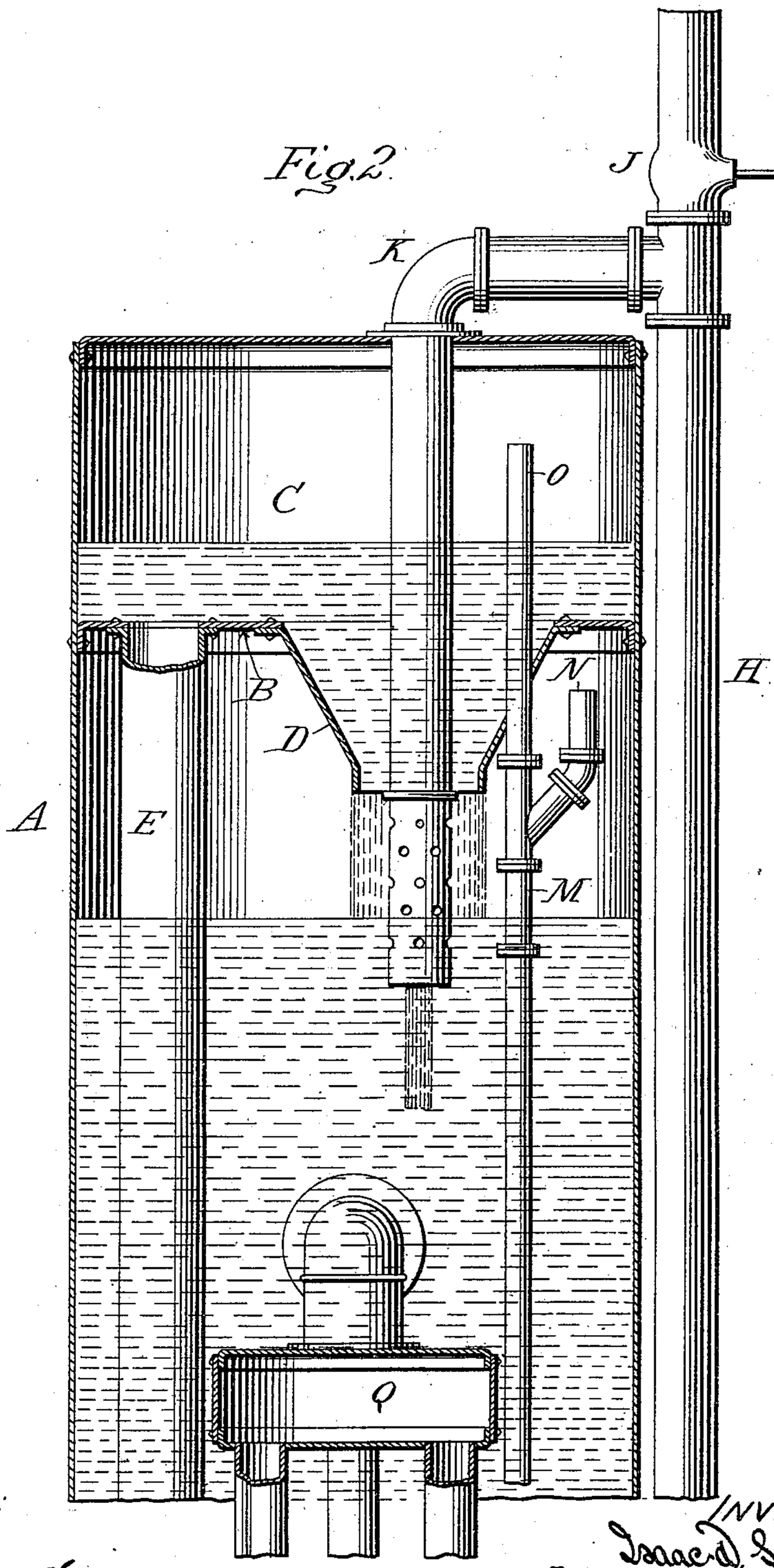
Fig. 2.

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# UNITED STATES PATENT OFFICE.

ISAAC D. SMEAD, OF CINCINNATI, OHIO.

## HOT-WATER HEATING SYSTEM.

SPECIFICATION forming part of Letters Patent No. 694,206, dated February 25, 1902.

Application filed October 12, 1901. Serial No. 78,495. (No model.)

*To all whom it may concern:*

Be it known that I, ISAAC D. SMEAD, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Hot-Water Heating Systems, of which the following is a specification.

My present invention pertains to hot-water heating systems, the construction and advantages of which will be hereinafter pointed out, reference being had to the annexed drawings, wherein—

Figure 1 is a vertical sectional view of a plant constructed in accordance with my invention, and Fig. 2 an enlarged detail view of the upper portion of the reservoir or boiler.

It has heretofore been proposed to utilize exhaust-steam from various forms of power plants in the heating of a body of water and to employ the water so heated in the warming or heating of buildings and for other commercial purposes. The present invention relates to plants of this type, and has for its object the production of a heater wherein the steam, exhaust or live, may be utilized to the best advantage and without creating any back pressure in the steam-supply pipe, but rather, if at all, tending to draw the steam from the supply-pipe.

Referring more particularly to Fig. 1, A indicates the water reservoir or boiler, provided with a diaphragm B, near its upper end, forming a chamber C between it and the upper end of the boiler, which will be hereinafter referred to as the "expansion-chamber." A hopper or funnel-shaped member D, secured to the diaphragm, affords communication between the reservoir or boiler proper and the expansion-chamber.

E indicates the return-line of the heating system and, as will be seen, it enters the reservoir near the bottom thereof, extends upwardly therein, and discharges into the expansion-chamber above the diaphragm. The flow-line or outgoing pipe F is connected to the lower end of the reservoir, a pump G being employed to insure proper circulation of the water through the heating system.

H denotes the pipe leading from the source of exhaust-steam. As will be seen, the pipe extends up to a point above the boiler through casing I, surrounding the upper end thereof, to the atmosphere. A valve J is interposed in the pipe to cause the steam when so desired to pass through a lateral or branch pipe K, the pipe entering the upper end of the boiler and passing down through the funnel or hopper D to a point slightly below the lower end thereof. The lower end of said pipe K is preferably perforated, as shown, and extends downwardly below the point of normal water-level of the boiler.

A live-steam pipe L may be connected to the exhaust-steam pipe H, the live steam being employed as an auxiliary to the exhaust-steam in severe weather or being used above when the power plant is not operating, exhaust-steam being not available at such times.

An overflow-pipe (designated by M) is employed, one member N thereof terminating at a point below the diaphragm and the other, O, extending up through the diaphragm into the upper part of the expansion-chamber. This overflow-pipe permits the oil introduced by the steam to pass out of both tanks. It also prevents any pressure caused by overheating of the water and likewise permits an overflow if the system gets full.

It will be understood that the reservoir or boiler is of such height or is so elevated that water will be supplied therefrom to the highest radiator included in the system.

The operation of the apparatus is apparent. Water to a sufficient amount having been admitted to the system, the pump is started, forcing the water through the system and up through the return-pipe E into the expansion-chamber. It then flows down through the funnel and around the pipe K, coming into intimate contact with the steam passing from the pipe. The stream of water passing by the openings and the end of the pipe tends to create a suction in the pipe, and thus counteract any back pressure which may exist in the exhaust-steam pipe. The water in the reservoir is constantly agitated by the stream passing from the funnel, and the steam is thoroughly commingled therewith, the heat of the steam being thus thoroughly utilized.

As will be seen upon reference to Fig. 1, a fire-chamber is placed below the boiler or reservoir, tubes or flues P passing up there-

from into the boiler and connecting with a smoke-drum Q. A flue or stack R extends from the drum out through the boiler to a point above the same. Under ordinary conditions this portion of the apparatus will not be employed, but is provided in order to present an additional factor of safety and employed when for any reason the steam-supply fails. It may be entirely omitted, if so desired.

Having thus described my invention, what I claim is—

1. In combination with a water-reservoir; a diaphragm mounted in the upper end thereof; a funnel extending down from said diaphragm; a steam-supply pipe passing down through the funnel and terminating at a point slightly below the same; and means for supplying water to the reservoir at a point above the diaphragm.

2. In combination with a water-reservoir; a diaphragm mounted in the upper end thereof and provided with an opening; means for withdrawing water from said reservoir and returning the same thereto at a point above the diaphragm; and means for introducing steam into the water as it flows downwardly through the opening in the diaphragm.

3. In combination with a water-reservoir; a diaphragm secured in the upper portion thereof; a funnel extending downwardly from said diaphragm; means for withdrawing water from the reservoir and returning the same thereto at a point above the diaphragm; and a steam-supply pipe extending down through the funnel.

4. In combination with a water-reservoir; a diaphragm secured in the upper end thereof; a funnel extending downwardly from said diaphragm; a steam-supply pipe extending through the funnel and having a perforated end, and means for withdrawing water from the reservoir and returning the same thereto at a point above the diaphragm.

5. In combination with a water-reservoir; a diaphragm secured in the upper end thereof; a funnel extending downwardly from said diaphragm; a steam-supply pipe extending into said funnel; an overflow-pipe having openings above and below the diaphragm; and means for withdrawing water from the reservoir and returning the same thereto at a point above the diaphragm.

6. In combination with a water-reservoir; a circulating system in communication therewith; means for withdrawing the water from the lower portion of said reservoir and returning it to the upper end thereof; means for admitting steam to the upper portion of the reservoir and bringing it in intimate contact with the water as it is returned to the upper end of the reservoir; and a furnace located below the reservoir.

7. In combination with a water-reservoir; a circulating system in communication therewith; means for withdrawing the water from the lower portion of said reservoir and returning it to the upper end thereof; means for admitting steam to the upper portion of the reservoir and bringing it in intimate contact with the water as it is returned to the upper end of the reservoir; a fire-drum located within the reservoir; a flue connected to said drum and extending outwardly through the reservoir above the drum; a fire-chamber located beneath the reservoir; and tubes extending from the fire-chamber to the drum.

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

ISAAC D. SMEAD.

Witnesses:
A. M. AINSLIE,
BURTON A. SMEAD.