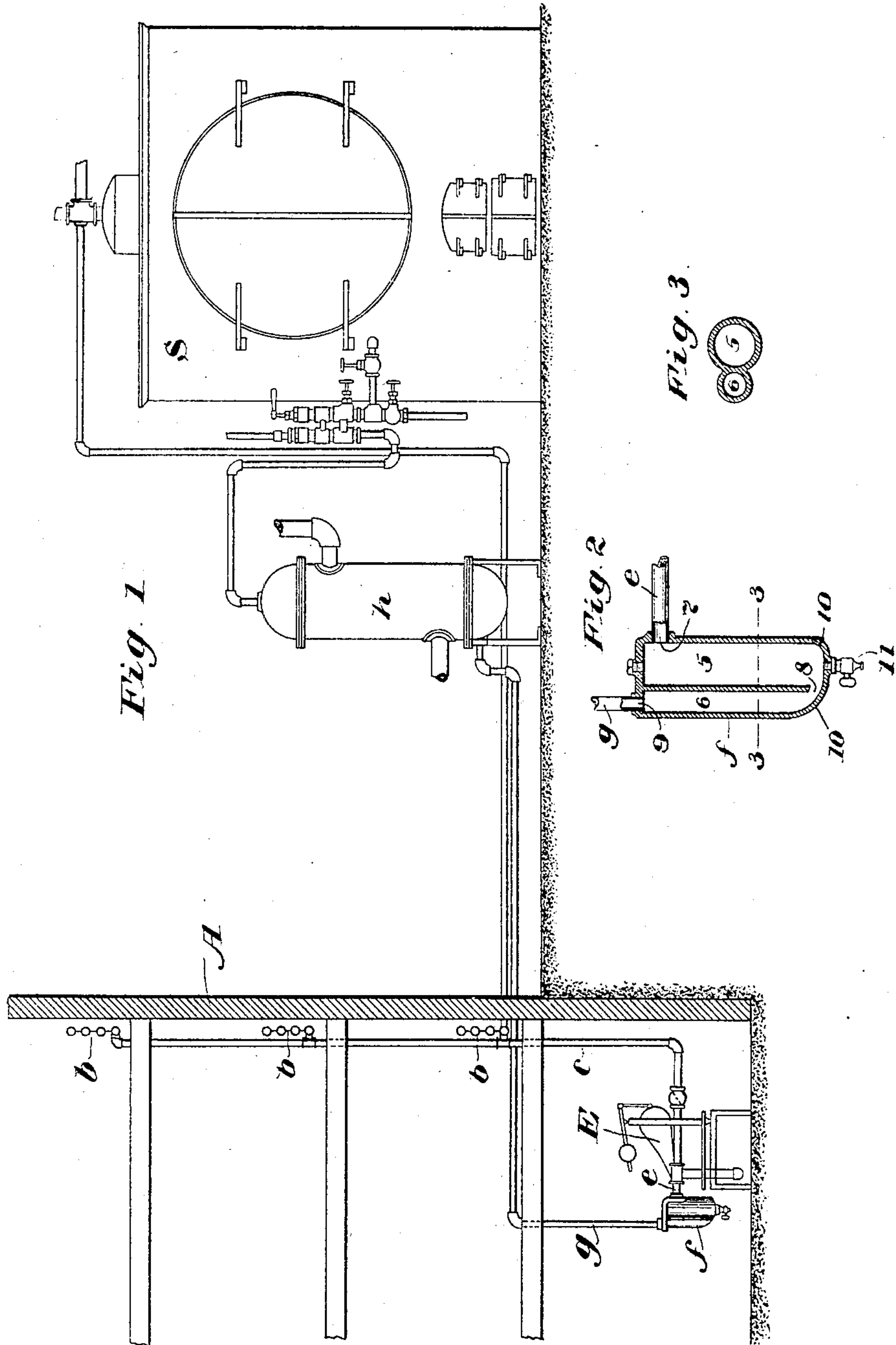


No. 809,022.

PATENTED JAN. 2, 1906.

S. W. SINSHEIMER.
AUTOMATIC LIFT SEPARATOR.
APPLICATION FILED MAR. 7, 1904.



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UNITED STATES PATENT OFFICE.

SIDNEY W. SINSHEIMER, OF NEW YORK, N. Y.

AUTOMATIC LIFT-SEPARATOR.

No. 809,022.

Specification of Letters Patent.

Patented Jan. 2, 1906.

Application filed March 7, 1904. Serial No. 196,789.

To all whom it may concern:

Be it known that I, SIDNEY W. SINSHEIMER, a citizen of the United States, residing at New York, in the county and State of New York, have invented an Improvement in Automatic Lift-Separators for Steam-Trap Deliveries, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

Steam-traps are commonly employed in connection with steam-heating and other systems to conduct the returned water or water of condensation therefrom to a suitable discharge-point, frequently a feed-water heater, where it is employed directly or indirectly in connection with the supplying of the boiler with its feed-water. This returned water is usually under more or less pressure, frequently sufficient to lift the water from the trap or equivalent device controlling the return to a discharge-point at a level considerably above the same, and while this is a great convenience and may be used often with great advantage it is a fact, nevertheless, that frequent difficulty is experienced in so lifting the water from such trap or equivalent device, owing to the liability of the steam which ordinarily accompanies returned water in greater or less quantity becoming pocketed in the lift-pipe and not only blocking the lift but actually forcing the water back into or toward the trap or device supposed to lift it.

My invention comprehends means introduced in or employed in connection with a lift or other device such as above referred to and which acts to separate the steam from the returned water which is to be lifted, leaving substantially no steam to accompany the water and to become pocketed in the lift-pipe to block the lift or cause return of the water to the trap.

My invention also comprehends means which in addition to the above will employ the separated steam as an actual aid in the lifting of the water from which it has been separated.

The foregoing with other features of my invention will be hereinafter described and will be best understood from a description of the best mode of applying the invention now known to me.

In the accompanying drawings, illustrating one embodiment of my invention, Figure 1 in diagram shows a system equipped with means made in accordance with my invention; Fig.

2, a vertical section of the separator which constitutes the form or means herein employed; and Fig. 3, a cross-section on the dotted line 3 3, Fig. 2.

In the particular embodiment of my invention selected for illustration herein, referring to the drawings, A typifies any suitable building containing a circulatory or, it may be, heating system typified at *b b*, and supplied with steam from any suitable or convenient source S. The water of condensation or water returned from this system, whatever it may be, is received in and flows through the return-pipe *c* to a usual steam-trap—such, for example, as the well-known Bundy trap—or other device E, adapted to lift said water to the desired discharge-level by means of the pressure in the return pipe or system by power or other means. Whatever the form of device or apparatus for so lifting the returned water, the delivery-pipe thereof (marked *e*) in accordance with the embodiment of my invention here illustrated enters what I may call a “lift-separator” *f*. The water, passing thence by the delivery-pipe thereof (marked *g*) to the desired elevation, is there delivered in desired manner, as into a feed-water heater *h* for the generator.

Referring now particularly to Figs. 2 and 3, the lift-separator *f* comprises two chambers, (marked, respectively, 5 and 6,) the chamber 5 being the entrance-chamber, with its inlet 7 at or near its upper end and its outlet 8, preferably of the same area, at or near the lower end and communicating thereat with the chamber 6, which is smaller in capacity than the chamber 5. The outlet from the smaller chamber 6 is indicated at 9 at or near its upper end.

At each periodic discharge from the steam trap or device E the water therefrom, ordinarily warmed and heated and carrying with it more or less steam or vapor, enters the larger chamber 5 and by reason of the enlarged capacity thereof immediately expands, reducing its pressure below that of the return system and causing the steam to rise into the upper portion of the chamber and the water to gravitate to the bottom thereof, this reduction in pressure being accompanied also by a further vaporization of what was water on entering the chamber, so that when the separation has been completed the water in the bottom of the chamber contains practically no steam and no water of a temperature that would readily go into steam in its further

passage through the system, and so long as the trap or device E is open or discharging the pressure from the system is in direct communication with the interior of the chamber 5 of the lift-separator *f* and in consequence thereof will act downwardly upon the water therein and force the same through the chamber 6 and the pipe *g* to an elevation, the limit of which is determined by the pressure on the system *b*. In the normal condition of the system the discharge-pipe from the lift-separator and the chamber 6 are filled with water and a part also of the chamber 5. If any steam has been separated out from the water and not condensed, it will remain pocketed in the top of the chamber 5, and therefore will not interfere with the discharging column of water in the pipe *g*. If no steam has been separated out from the water or the separated steam has been condensed, the chamber will be completely filled as if it were nothing but a section of pipe in the discharge-pipe of the steam-trap or other lifting device.

Whatever may be the conditions and at whichever side the steam-trap or wherever else the lift-separator may be located, it is evident that any steam which may accompany the water or which is readily vaporized from the water will collect in the top of the chamber 5, thus leaving nothing but water to go forward through the system. Thus it is clear that no steam as such will go out with the water.

The bottoms of the two chambers 5 and 6 (see Fig. 2) are shown inclined, as at 10, to cause any sediment received into the chambers 5 or 6 to gravitate to the bottom, where it may be removed through a bleeder or discharge-opening at 11.

My invention is not restricted to the particular embodiment or application thereof here shown and described for illustrative

purposes, but may be varied within the spirit and scope of the invention here disclosed.

I claim—

1. The combination with a circulatory pipe or system of a steam-trap for lifting the returned water and a lift-separator interposed in the delivery from said steam-trap and comprising relatively large and small connected inlet and outlet chambers for the purpose described.

2. The combination with a pipe or system of a lifting apparatus connected with the same and constructed to lift the water therefrom, and a lift-separator interposed in the delivery of said apparatus to separate the steam from the water flowing through said delivery and assist in lifting the returned water.

3. The combination with a pipe or system of a lifting apparatus connected with the same and constructed to lift the water therefrom, and means interposed in a connection of said apparatus to separate the steam from the water flowing through said connection and to assist the lifting apparatus in the lifting operation.

4. The described lift-separator comprising relatively immovable chambers connected at or near their lower ends, the one serving as an inlet-chamber and having an inlet-opening at its upper end, the other serving as an outlet-chamber and having an outlet-opening at its lower end, said inlet-chamber being relatively larger in capacity than said outlet-chamber.

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

SIDNEY W. SINSHEIMER.

Witnesses:

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