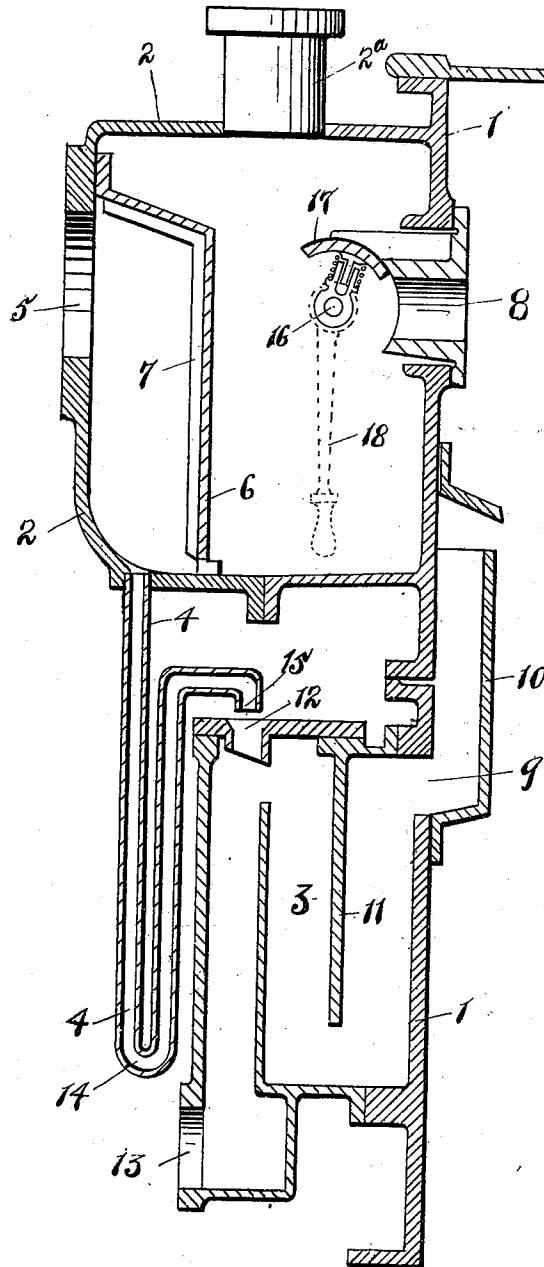


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FEED WATER HEATER AND SEPARATOR.
APPLICATION FILED JAN. 18, 1910.

996,578.

Patented June 27, 1911.



Witnesses
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FEED-WATER HEATER AND SEPARATOR.

996,578.

Specification of Letters Patent. Patented June 27, 1911.

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To all whom it may concern:

Be it known that I, JOSEPH WILLARD GAMBLE, a citizen of the United States of America, and resident of the city and county of Philadelphia, State of Pennsylvania, have invented certain new and useful Improvements in Feed-Water Heaters and Separators, of which the following, taken in connection with the accompanying drawing, is a concise and complete description thereof.

The invention particularly relates to certain improvements in feed water heaters and separators, described and claimed in Patent No. 926,108, granted to me June 29th, 1909. Among the objects of my invention is to provide a complete and simple device, efficient and economical in operation, and especially for providing means therein for enabling one to clean the heater with perfect safety, free from any liability of scalding by reason of having the water in the overflow chamber forced back into the heater, which is liable to occur in structures of which I have knowledge, wherein the separator is in communication with the overflow chamber by an integral drip connection, through which the pressure of steam is communicated to and exerted upon the water in the overflow chamber. For the accomplishment of this object, as well as others, I have provided, as illustrated in the accompanying drawing, and described in the following specification, one form of structure that I may employ in carrying out my invention. I would have it understood, however, that I am not limited to the particular shape, proportion or arrangement of the device which I have illustrated as the one by which I accomplish my objects, since other equivalent means may be employed without departing from the scope and tenor of my claims.

Referring in detail to the drawings, —1— represents a portion of the wall or shell of a feed water heater of the well known open type, in which the exhaust steam and raw water co-mingle, for the purpose of raising the temperature of the water to fit it for special use.

—2— indicates a separator.
—3— indicates the overflow chamber from the heater.
—4— indicates a drip connection from the separator to the overflow chamber.

The separator —2— is provided with an exhaust steam inlet —5—, the baffle —6— provided with ribs or corrugations —7—, and an auxiliary steam outlet —2^a— when desirable. The heater is provided with an exhaust steam inlet —8— from the separator —2— and an overflow outlet —9—.

—10— indicates a skimmer fastened to the heater shell down through and between which the overflow water passes to the outlet and into the overflow chamber —3—. The overflow chamber is divided into two compartments by a partition —11— for the purpose of providing a suitable water seal therein.

—12— indicates an opening into the overflow chamber, and —13— an outlet from the overflow chamber to waste.

The separator drain or drip connection —4— comprises an elongated pipe or conduit dipped or reversed upon itself at —14— for the purpose of providing a water seal therein, and having its reverse end again reversed or curved so that its discharge orifice —15— is in line with and slightly spaced from the opening —12— of the overflow chamber —3—.

Intermediate the heater and the separator and controlling the exhaust steam inlet —8— to the heater, is rotatably mounted upon a spindle —16— a valve —17— operated by handle —18—.

The operation is as follows: The exhaust steam entering the separator inlet —5— impinges on the baffle —6— where the solids or other impurities are separated. The purified steam passes around through suitable openings provided at the sides of the baffle (not shown), and, supposing the valve —17— is in the position shown, the steam will pass through the inlet —8— into the heater, where it comes into physical contact with the raw water, the latter becoming heated thereby. The separated impurities pass down into the drip connection —4— which has been suitably water sealed, as explained, and are discharged therefrom into the opening —12— of the overflow chamber —3—. The overflow water from the heater passes down through the passage formed between the skimmer —10— and the shell of the heater into the water seal of the overflow chamber —3—, both drip

discharge and overflow water passing to waste through the outlet —13— of the overflow chamber —3—. When it is desired to cut the heater out of communication with the separator, the handle —18— of the rotary valve —17— is operated to close the port or exhaust steam inlet —8— to the heater, and the cleaning operation of the latter can then be accomplished with safety.

10 In this position of the valve —17— the exhaust steam may be led from the separator, if desired, through an auxiliary outlet —2^a— at the top of the separator to another point of use, in which case the separator will perform its usual and intended function of purifying the steam for such use, the drip impurities passing off through the outlet —4— and the overflow chamber as heretofore described.

20 The object of having the drip connection —4— separate from the overflow chamber —3— is important, since if physical connection existed between the two, there would be a liability of the pressure of the steam within the separator being transmitted to the water seal in the overflow chamber, and result in forcing the water or drain therein back through the overflow opening into the heater, and thus possibly scald the workman and otherwise interfere with the safe cleaning of the same. By having the drip —4— and the overflow —3— separate and apart from one another, as shown, this liability is eliminated, since the steam, by reason of such pressure would find vent or relief through the gap between the discharge orifice —15— and the overflow chamber opening —12—. It will further be apparent from the above description that by leaving the gap between the water seal drip connection —4— and the overflow chamber —3—, it can be determined whether or not the separator is being properly drained, and whether or not there is any obstruction in the overflow chamber to waste. This arrangement acts as a telltale, and indicates whether the drip —4— from the separator, and the overflow chamber from the heater are at all times clear, since, if the passageway should become seriously obstructed, water would back up and pass out of the opening —12—. If the drip connection —4— from the separator, on the other hand, should become clogged, it quickly becomes apparent, because normally, a small amount of drip would constantly pass from the drip pipe —4— and could be observed from the orifice —15— at the point of discharge. Normally, the amount of drip is small, but in any event, only a small amount of water can be held in this water seal, and a gap between the drip connection —4— and the

overflow chamber —3— precludes the possibility of placing sufficient pressure upon the water seal in the chamber —3— to blow the same back into the heater.

Where I have used the term "overflow chamber," I mean any overflow into and through which may be discharged the separated waste products of the separator or the surplus water from the heater or both, and as a special type of overflow chamber, I would mention the well known form of steam trap. Where I have used the words "combined heater and separator," I mean both the heater and the separator form part of the same structural unit. Where I have used the word "unitary structure," I mean that the component parts, such, for instance, as the heater, separator and overflow, form part of the same structural unit, they are not necessarily integral.

Having thus described my invention, what I claim and desire to protect by Letters Patent, is:

1. A combined heater and separator; an overflow chamber for said heater; and a water sealed drip for said separator, independent of but discharging into said overflow chamber.

2. A combined heater and separator; an overflow chamber formed integral with said heater; and a water seal drip for said separator, separate from and discharging into said overflow chamber.

3. The combination of a heater; a separator; and an overflow chamber; a valve intermediate said separator and heater; and a water sealed drip for said separator intermediate the separator and overflow.

4. The combination of a heater having a water sealed overflow; a separator; an exhaust cut out valve intermediate the heater and separator; and a water sealed drip for said separator, intermediate the separator and overflow.

5. A combined heater and separator; an overflow from said heater formed integral therewith, and provided with a water seal; and a water seal drip for said separator, independent of, but discharging into said overflow.

6. The combination of a heater; a separator; an overflow chamber; a valve intermediate said separator and heater; and a passageway intermediate the separator and overflow chamber, a portion of the passageway extending upward to a point higher than the lowest point of the inlet portion of the passage.

JOSEPH WILLARD GAMBLE.

Witnesses:

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