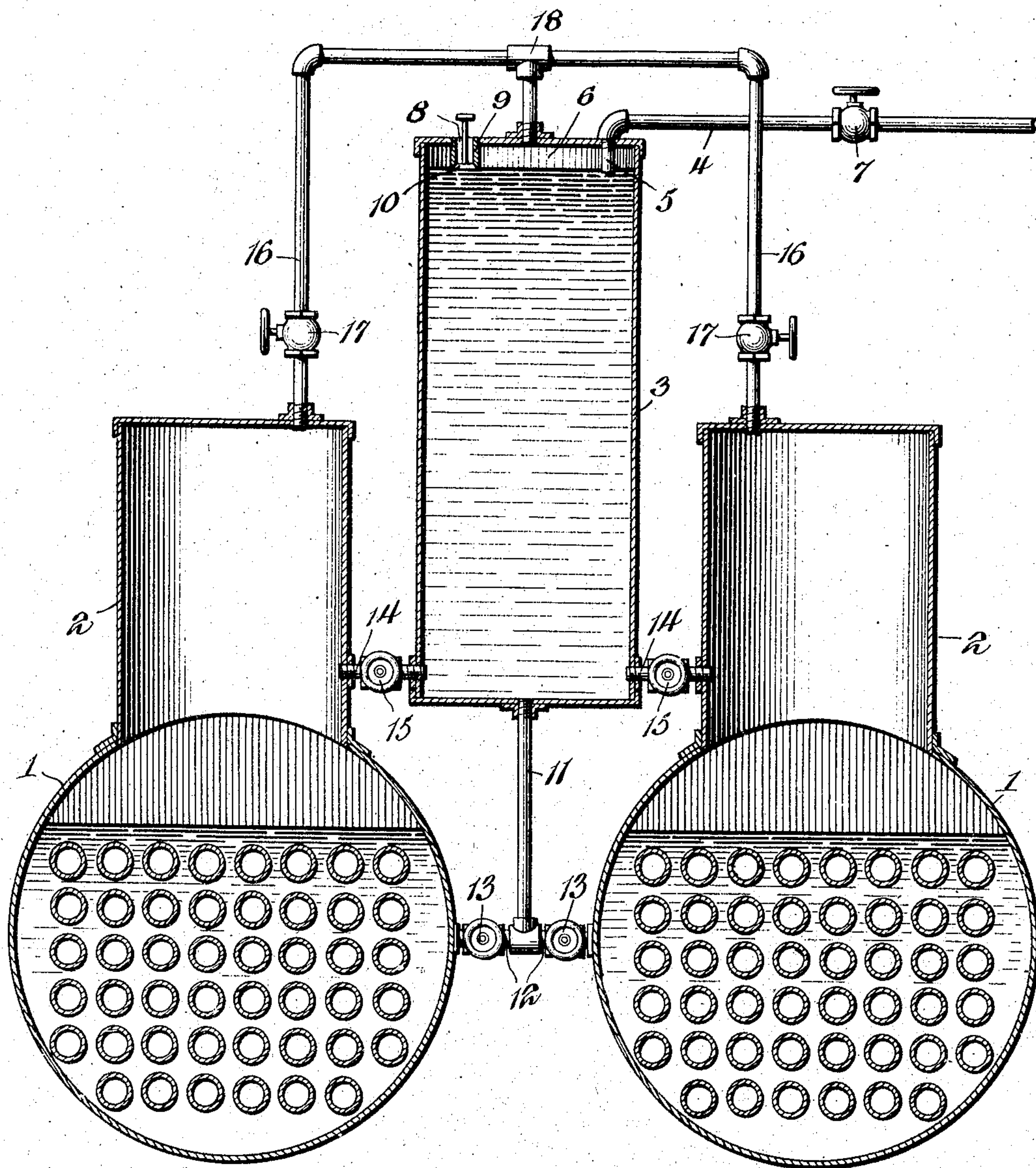


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A. STEWART.
WATER HEATER.

APPLICATION FILED DEC 19, 1904.



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ALAN STEWART, OF CAMDEN, NEW JERSEY.

WATER-HEATER.

SPECIFICATION forming part of Letters Patent No. 791,587, dated June 6, 1905.

Application filed December 19, 1904. Serial No. 237,531.

To all whom it may concern:

Be it known that I, ALAN STEWART, a citizen of the United States, residing at Camden, in the county of Camden and State of New Jersey, have invented a new and useful Water Heater and Feeder for Steam-Boilers, of which the following is a specification.

The present invention relates to means for heating feed-water and delivering the same to steam-boilers.

One of the principal objects is to provide simple means of a novel nature whereby feed-water can be heated by the steam from a boiler before its entrance to such boiler and after being so heated may be permitted to flow by gravity into the boiler, the structure, moreover, being such that it can be readily understood and properly operated by a person comparatively unskilled in this art.

The drawing is a view in vertical section of an embodiment of the invention that is at present considered preferable, said invention, however, not being limited solely to the illustrated structure, as will be apparent from an inspection of the appended claims.

In the embodiment illustrated a pair of horizontal or marine boilers is shown, each comprising a body 1 and a dome 2. Between the domes is located a feed-water reservoir 3, the bottom of which is preferably in line with or slightly above the tops of the boiler-bodies 1. This reservoir is made of sufficient strength to withstand the direct steam-pressure from the boiler. A water-supply pipe 4, leading from any suitable source of supply, has its discharge end 5 extending into the top of the reservoir and depending below the same, so that a steam-space 6 is formed above the lower end of the water-supply pipe, as is hereinafter more fully described. The supply of water through said pipe is controlled by a suitable valve 7. A vent-opening 8 in the top of the reservoir communicates with the outside through a depending hollow stem 9 and is controlled by a valve 10, preferably of the gravity type, said valve closing the vent upon its upward movement and leaving the same open when in its lowermost position.

A water-supply pipe 11 leads from the lower

portion of the reservoir downwardly and has oppositely-extending branches 12, respectively connected and communicating with the interiors of the boiler-bodies below the water-lines thereof. The flow of water through these branches is controlled by suitable valves 13. Steam-heater pipes 14 connect the domes 2 and the lower portion of the reservoir, the flow of steam through these pipes being regulated and controlled by suitable valves 15. Steam-supply pipes 16, preferably leading from the tops of the domes 2 and having valves 17, are connected to a common coupling 18, communicating directly with the top of the reservoir above the lower end 5 of the water-supply pipe, and therefore with the steam-space 6.

The operation of the structure may be briefly outlined as follows: Assuming the various valves closed and the tank or reservoir 3 empty, it will be apparent that the vent 8 will be open, as the gravity-valve 9 will be in its lowermost position. If now the valve 7 of the water-supply pipe is opened, it will be clear that the water will flow into the reservoir until its level reaches the lower end 5 of the water-supply pipe and the lower end of the stem 9, at the same time closing the valve 10. The valve 7 is then closed and either or both of the valves 15 are opened. Thereupon steam will pass from one or both of the domes into the lower portion of the reservoir and will thoroughly heat the water contained therein. When sufficiently heated, the valves 15 are closed. The valves 13 and 17 are thereupon opened. Consequently steam will be introduced into the steam-space formed in the top of the reservoir, the pressure within the reservoir and the boiler will be equalized, and the heated water contained in said reservoir will flow into the boilers.

It will of course be understood that the apparatus may be employed with both boilers or with either independently, and consequently it will be seen that the apparatus is as useful in connection with a single boiler as a nest of the same.

It will be apparent from the accompanying drawing that the structure is very simple, the

parts readily understood, and, furthermore, that there are no elements of a delicate nature liable to become deranged.

The simple means whereby a steam-space is secured in the upper portion of the reservoir and the simple arrangement for heating the water in said reservoir are important features of the invention.

From the foregoing it is thought that the construction, operation, and many advantages of the herein-described invention will be apparent to those skilled in the art without further description, and it will be understood that various changes in the size, shape, portion, and minor details of construction may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

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

1. In apparatus of the character described, the combination with a boiler, of a feed-water reservoir, water-conducting means connecting the lower portion of the reservoir and the boiler, a water-supply conduit connected to the reservoir, a vent device in the upper portion of the reservoir, automatic means located in the upper portion of the reservoir and operated by the water therein for closing said vent before the reservoir is completely filled with water, thereby leaving a steam-space, and means connecting the boiler and said steam-space for introducing steam thereinto.
2. In apparatus of the character described, the combination with a boiler, of a feed-water

reservoir located above the level of the water in the boiler, a water-conducting pipe connecting the lower portions of the reservoir and boiler, a water-supply conduit extending through the top of the reservoir and depending within the same, forming a steam-space, a vent device in the upper portion of the reservoir, a float-actuated valve located in the upper portion of the reservoir and operated by the water therein for closing said vent device before the reservoir is completely filled with water, and a steam-pipe connecting the boiler and said steam-space for introducing steam thereinto.

3. In apparatus of the character described, the combination with a plurality of boilers having steam-domes, of a tank or reservoir, a water-distributing pipe connected to the lower portion of the reservoir and having branches connected with the boilers, a water-supply pipe extending into the upper portion of the reservoir below the top, forming a steam-space, a vent device for said space, an automatically-operated valve for closing the vent when a predetermined amount of water is in the reservoir, and valved steam-conducting pipes connecting the steam-space of the reservoir and the domes of the boilers.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

ALAN STEWART.

Witnesses:

JOHN H. SIGGERS,
B. G. FOSTER.