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J. P. URBANEK.

FEED WATER HEATER.

APPLICATION FILED SEPT. 16, 1903.

NO MODEL.

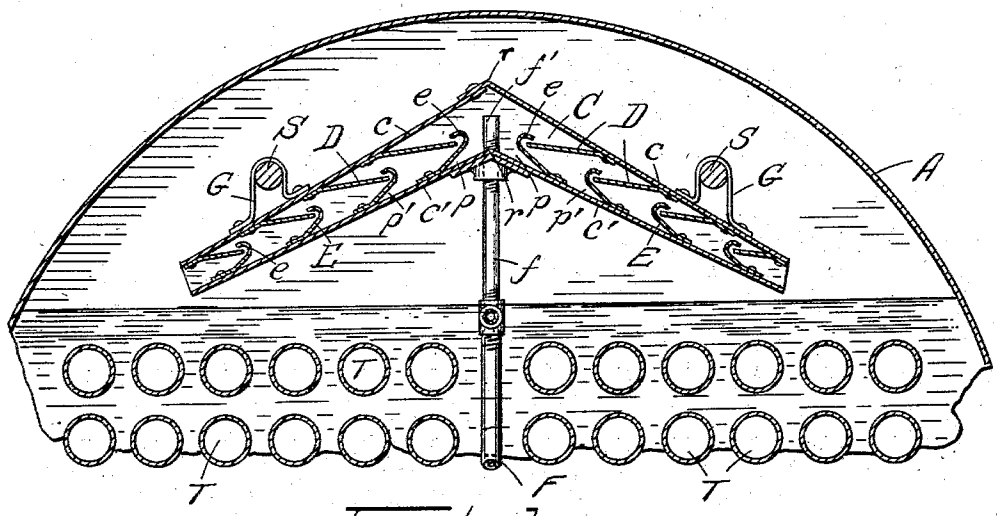


FIG. 1.

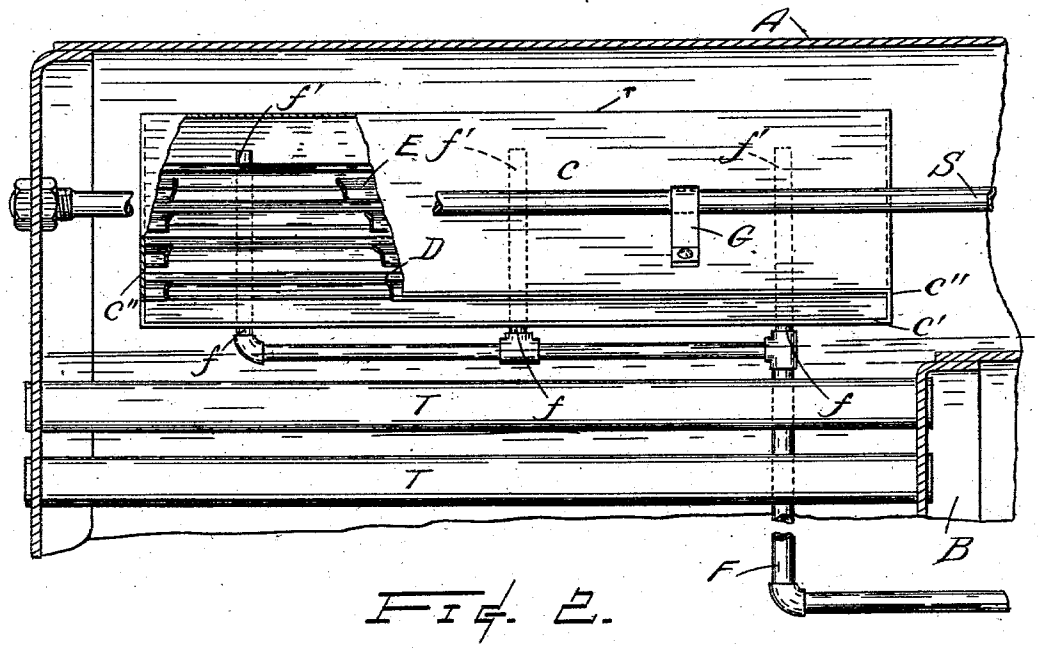


FIG. 2.

WITNESSES:

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No. 752,270. Patented February 16, 1904.

UNITED STATES PATENT OFFICE.

JOHN P. URBANEK, OF SEATTLE, WASHINGTON.

FEED-WATER HEATER.

SPECIFICATION forming part of Letters Patent No. 752,270, dated February 16, 1904.

Application filed September 16, 1903. Serial No. 173,381. (No model.)

To all whom it may concern:

Be it known that I, JOHN P. URBANEK, a citizen of the United States, residing at Seattle, in the county of King and State of Washington, have invented certain new and useful Improvements in Feed-Water Heaters and Separators for Steam-Boilers, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to a combined feed-water heater and sediment-collector.

The object of the invention is to provide a simple and cheap apparatus which will efficiently accomplish the following results: first, the rapid heating of the feed-water; second, to collect for easy removal the sediment usually found in water available for use in a boiler and which if permitted to be deposited upon the hot surfaces of the boiler would hasten the destruction of the same, and, third, to separate the contained air from the feed-water prior to its mixture with the body of water within the boiler, as globules of air by adhering to the heating-surfaces of the boiler is a frequent cause of the corrosion and "pitting" of the metal.

With these ends in view my invention consists in the novel construction and combination of parts, as will hereinafter be described, and pointed out in the claims.

In the accompanying drawings, where similar letters represent corresponding parts in both views, Figure 1 shows vertical transverse sections of a portion of a steam-boiler and a water-heater constructed in accordance with my invention; and Fig. 2 is a longitudinal vertical section of a boiler with a side elevation, partly broken away, of my invention installed therein.

The letter A designates the shell of a boiler, which may be of any special or ordinary construction and in this instance is provided with a combustion-chamber B, which is connected to the front of the boiler by heating-tubes T, as is the practice in marine and some other types of boilers. Positioned within the steam-space of the boiler is a casing C, comprised of a top plate c and a bottom plate c', which are joined integrally together at the ends by plates c'' with open sides, through which the steam may pass freely into the casing. The transverse form of the casing is substantially that of an inverted **V**, wherein the top and bottom plates each slope downwardly in opposite directions from a central longitudinal ridge r. Arranged internally of the said casing and upon each side of the said medial ridge are series of shelves D and partitions E, respectively secured to the aforesaid top plate c and the bottom plate c' of the casing and extending its entire length. The shelves project toward the longitudinal axis of the casing and are inclined upwardly in order that the inner edges of each will be somewhat higher than the edges contiguous of the plate to which connected.

The partitions E extend upwardly above the level of the adjacent edges of the shelves and are so disposed or formed, as with a bend e along their upper edges, that they will overlap without making contact with the shelves.

F represents the water induction or feed pipe leading from the water-supply—as, for example, a reservoir or "hot-well"—and is provided at its discharge end with one or more branches f, projected up through the bottom of the casing and along its longitudinal axis and severally terminating in discharge-orifices f'. The casing is reliably secured to the boiler by any suitable means, and the stirrups G, fixedly connected to the casing and hung over stay-rods S, common to many varieties of boilers, I find to be very satisfactory.

The operation will now be described. Feed-water being forced through the induction-pipe is delivered into the casing, where it fills the pockets p, from which it flows over upon the uppermost of shelves D, and from them it spills into the pockets p' next below, and so on by successive steps until the water is delivered through the side openings of the casing and upon the surface of the water body already in the boiler. The feed-water is meanwhile subjected to the full amount of heat contained in the steam, which not only raises the temperature of the feed-water, but likewise causes the suspended air and sedimentary matter therein to separate, the former to mingle with the steam and the other to be precipitated upon the inner surfaces of the device and from

which it may be easily removed without coming in contact with and jeopardizing the safety of the boiler or shorten its length of service.

It may be noted that as the feed-water passes through the device much of it is directly evaporated therein unless it is supplied in unusually large quantities, in which event it will have a tendency as it falls upon the water beneath to prevent the foaming or "priming," which is oftentimes encountered.

The several parts of the apparatus are preferably assembled and connected one with another, so as to be readily taken apart in order to clean their surfaces.

I do not wish it to be understood that I confine myself to the particular form of apparatus hereinbefore described, as it is obvious that changes or modifications may be made therein without departing from the spirit of the invention or sacrificing its advantages. For instance, the casing may be made circular in horizontal section, with the water-delivery extending entirely around the perimeter thereof, the shelves and partitions of course being then made circular to conform to this outline. I prefer, however, to use the apparatus as set forth, inasmuch as it has demonstrated its efficiency for use upon vessels under very severe tests, and it is with marine boilers where such an appliance is most needed.

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

1. In a device of the character described, the combination with the feed-water pipe provided with an orifice extending interiorly of a case, said case comprising inclined top and bottom plates, of a series of inclined shelves and a series of partitions having one edge of each overlapping the adjacent shelf.

2. In a device of the character described, the combination of a casing having oppositely-arranged discharge-openings and formed with an inclined top and an inclined bottom, series of inclined shelves, and inclined partitions interiorly of the case and arranged in pairs, and means for feeding water into the casing above the upper shelves or partitions.

3. The herein-described apparatus, comprising, in combination, a case of an inverted-V-shaped transverse section with closed ends and open along its longitudinal edges, a series of inclined shelves and a series of partitions respectively secured to the top and bottom of the said case and extending from end to end of its interior length and alternately overlapping one another, and a feed-pipe provided with branches terminating in orifices extending within the case and above the uppermost of the said partitions or shelves, substantially as and for the purposes set forth.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN P. URBANEK.

Witnesses:
PIERRE BARNES,
HENRY S. NOON.