P. MEJANI.

FEED WATER HEATER.

APPLICATION FILED MAR. 8, 1911.

1,091,369. Patented Mar. 24, 1914.

Fig. 1

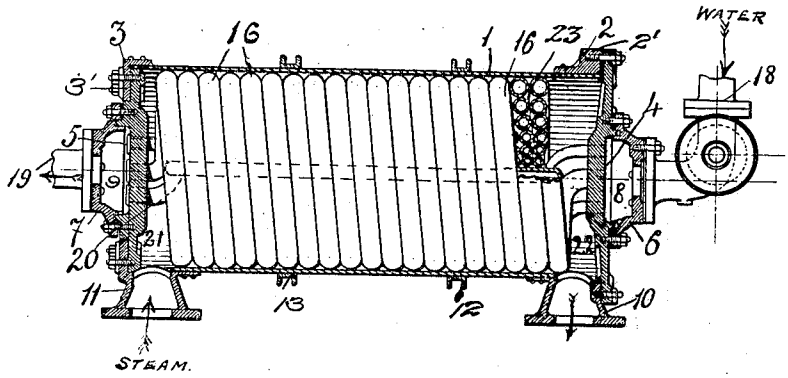
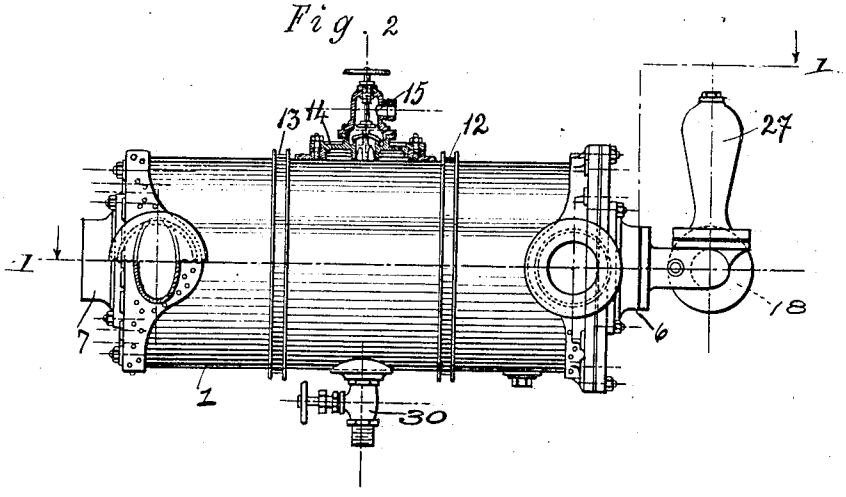


Fig. 2



Witnesses:
D. N. Fowler Jr.
N. L. Meem.

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UNITED STATES PATENT OFFICE.

PAOLO MEJANI, OF CHIAVARI, ITALY.

FEED-WATER HEATER.

1,091,369. Specification of Letters Patent. Patented Mar. 24, 1914.

Application filed March 8, 1911. Serial No. 613,060.

To all whom it may concern:

Be it known that I, PAOLO MEJANI, a subject of the King of Italy, and resident of Chiavari, in the Kingdom of Italy, have invented certain new and useful Improvements in Feed-Water Heaters, of which the following is a specification.

This invention relates to feed water heaters for boilers of that class in which the heating fluid passes through a cylindrical vessel containing a plurality of spiral tubes for the circulation of the water to be heated and in which these tubes form coaxial helices concentric with the walls of the vessel.

The invention consists in certain improvements in these feed water heaters which make it possible to utilize more effectively the heating fluid.

In the accompanying drawings: Figure 1 is a view partly in longitudinal section on the line 1—1 of Fig. 2, the valves being removed. Fig. 2 is a side elevation.

The end portions of a cylindrical casing 1, constructed of plates or cast metal, are provided with rings 2 and 3 for securing the two plates 4 and 5, to which are secured the concentric caps 6 and 7 which form chambers 8 and 9 for the circulating water, and which at their outer ends have plane surfaces to which are secured the feed pipes conveying the water to be heated. The flange of ring 3 for securing plate 5 is turned inwardly, and the flange of ring 2 for securing plate 4 is turned outwardly. The flanges are designated respectively 3′ and 2′ and each ring including its flange is L shaped in cross section. The rings 2 and 3 are connected with the steam inlet and outlet 11 and 10, respectively. The casing is strengthened with bands 12 and 13, the cross section of which is of channel formation. A man hole 14 is provided with a suitable cover and the cover carries a safety valve 15. Plates 4 and 5 are thickened at their central portions in order to provide a substantial connection for the end portions for the helical tubes 16, through which the water passes. The length, diameter and number of these tubes is proportional to the dimensions of the apparatus and they are shaped so that they nest one within the other, to form concentric helices of small pitch. The diameters of the tubes diminish respectively with the diameters of the spirals, in order to facilitate the working and make it possible to secure a compact arrangement, so that the sum of the free surfaces, or the outside surfaces of the spiral tubes, corresponds to the surface of the section of the steam inlet tube 11 and outlet 10, while the total area of the internal surfaces of the tubes corresponds to the surface of the section of feed tubes 18 and 19. In this way the greatest efficiency is obtained and at the same time a constant pressure without expansion or back pressure. All of the coils are approximately in contact so that spiral channels for the steam are formed between the spiral tubes. The steam is therefore prevented from passing directly from one end of the casing to the other and must necessarily pass between the spiral tubes, following their complete course. The ends of the tubes are suitably bent to form nozzles which are connected with apertures in the tube plates, the nozzles being at equal distances from each other and parallelly arranged. The ends of the tubes are solidly fixed to plates 4 and 5 by expanding and heading them at their outer edges.

The series of spiral tubes completely fill the interior of the casing, and a tube 20, closed at its ends, is placed along the axis of the central spiral coil so as to fill the free space left between the helical tubes and the casing, and prevent the direct passage of the heating fluid through this space.

The apparatus may be operated either with exhaust steam or live steam. The heating fluid enters the casing at the opposite end to that at which the water to be heated enters. If the water flows in through pipe 18, cap 6 and chamber 8, it passes through the tubes and discharges through chamber 9 and outlet 19. The steam enters at 11, passes through chamber 21, channels 23, chamber 22, and outlet 10. If desired, the operation may be reversed. The air chamber 27 is connected with the water inlet and a drip valve is located as shown at 30.

What I claim is:

A feed water heater for boilers comprising a housing, steam inlet and outlet, ports for the housing, located respectively at the ends thereof, a plurality of cylindrical helical tubes for conveying water, said tubes substantially filling the interior of the housing

and arranged with the cylindrical tubes and helices approximately in contact and in substantial contact when expanded by heat, forming spiral passage-ways for the steam, the diameters of which tubes are proportional to the diameters of the helices.

In testimony whereof I have signed my name in the presence of two subscribing witnesses this twenty-second day of February, 1911.

PAOLO MEJANI.

Witnesses:
COSTANTIN FRANCESCO,
PAGANELLI GUISEPPE.