July 29, 1930. H. E. YARROW 1,771,944

SUPERHEATER FOR WATER TUBE BOILERS

Filed Dec. 3, 1928

Fig. 1.

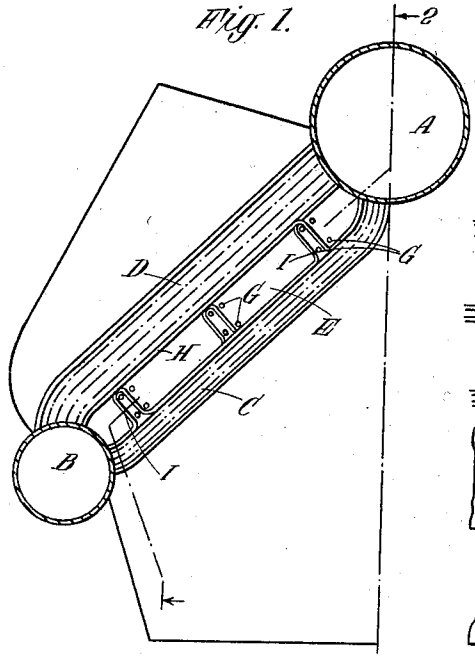


Fig. 2.

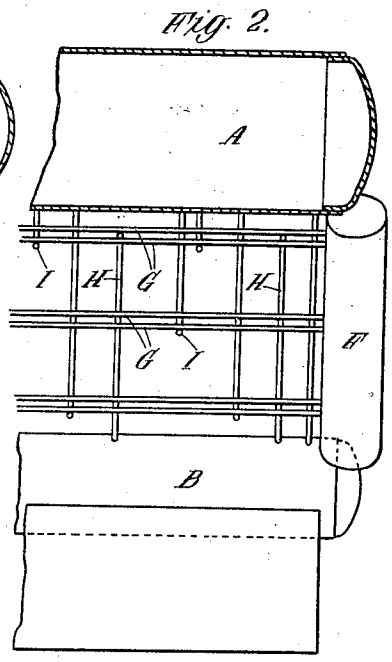
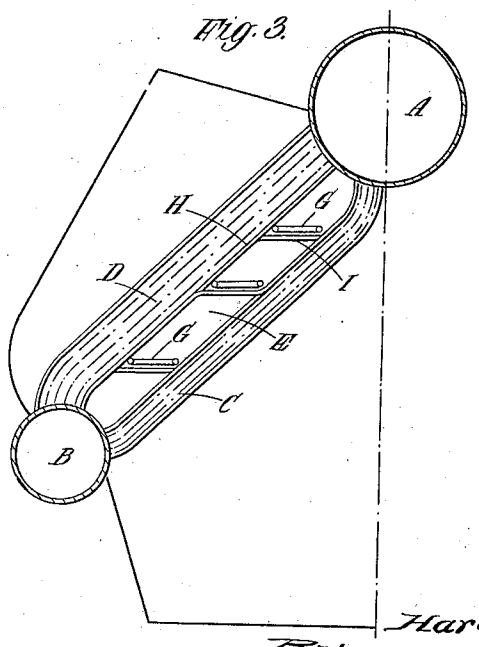


Fig. 3.



Inventor
Harold E. Yarrow
By Willis L. Ford
Attorney

Patented July 29, 1930 1,771,944

UNITED STATES PATENT OFFICE

HAROLD EDGAR YARROW, OF GLASGOW, SCOTLAND

SUPERHEATER FOR WATER-TUBE BOILERS

Application filed December 3, 1928, Serial No. 323,355, and in Great Britain January 6, 1928.

This invention relates to water tube boilers having superheaters in which the superheater tubes are horizontal or substantially horizontal and are accommodated in a space provided for the purpose between two banks of steam generating tubes connecting the steam drum with a parallel water drum situated at a lower level, or with two such water drums.

The object of this invention is to provide supports for the horizontally or substantially horizontally extending superheater tubes of such a character that they will not buckle under the heat to which they are exposed and thereby cause the superheater tubes to alter their position.

This object is attained according to the present invention by supporting the loops or tubes of the superheater upon a suitable number of the steam generating tubes which are suitably bent to traverse the intervening space between the two banks of steam generating tubes, either once or oftener, along their length so as to pass under superheater tubes and take their weight either directly or through interposed supplementary supporting elements. When the superheater tubes are not directly supported upon water tubes, any interposed supplementary supporting elements are made so short and are in such intimate contact with the water tubes that they are not liable to overheating.

For example, the supporting tubes may have short fins or equivalent projections welded on them and suitably shaped to form a firm support for the superheater tubes, or short distance pieces of cast iron or other suitable material may be provided in close contact with the two sets of tubes. Such fins or distance pieces being relatively short, the transmission of heat from them to the water-containing supporting tubes with which they are in close contact would be such as to keep the fins or the like from damage or distortion from the heat of the furnace gases.

The invention is illustrated in the accompanying drawings, wherein Fig. 1 is a transverse section of one side of a water tube boiler of the Yarrow type embodying the present invention; Fig. 2 is a longitudinal section on line 2—2 of Fig. 1, and Fig. 3 is a view corresponding with Fig. 1 of a modified arrangement.

In these drawings A is the steam drum of a Yarrow type water tube boiler and B is one of the water drums which is connected with the steam drum by two banks C and D of steam generating tubes. These banks of tubes are spaced apart and the intermediate space E accommodates the superheater tubes G which are in the form of U-tubes springing from and returning to the superheater header F.

To support these superheater tubes which extend horizontally or substantially horizontally within the space E, some of the generator tubes are bent so as to pass across the space E immediately underneath one or more of the superheater tubes G. Some of the tubes H of the outer bank D are shown bent in this manner to pass under the outgoing and return limbs of some of the superheater tubes G so as to support the same. Others of the steam generating tubes belonging to the inner bank C are similarly bent, as shown for example at I, to support other rows of superheater tubes. In these tubes a double bend is shown and it is not proposed usually to have more than one such double bend in a generating tube, although if desired such a tube may be bent so as to form the support for more than one row of superheater tubes.

It will be obvious that in this way each superheater tube can be supported at one or more points along its length by means of a tube or tubes in which water circulates and which may, as shown, be part of the general circulation system of the boiler.

In the construction of Fig. 3 each superheater tube has its outgoing and return limb arranged in the same horizontal plane, and this is an advantage because it is not then necessary to have such acute bends in the supporting tubes H, I.

Instead of the superheater tubes G resting directly upon the generating tubes H, I, the latter may have fins or projections welded to them and suitably shaped to form a support for the superheater tubes, or distance pieces may be used in close contact with the superheater tubes and the supporting tubes, and

so long as these fins or distance pieces are comparatively short, they will not be subject to distortion due to excessive temperatures, since the heat will be readily transmitted from them to the water flowing in the supporting tubes.

Having thus described the nature of the said invention and the best means I know of carrying the same into practical effect, I claim:—

1. A water tube boiler, having a superheater with substantially horizontal tubes, and two banks of steam generating tubes spaced apart to accommodate the superheater tubes, some of the said steam generating tubes being bent to traverse the intervening space between the said two banks of steam generating tubes so as to pass under superheater tubes and support the weight of the latter.

2. A water tube boiler, having a superheater with substantially horizontal tubes, and two banks of steam generating tubes spaced apart to accommodate the superheater tubes, some of the tubes of each bank of steam generating tubes being bent to traverse the intervening space between the said two banks of steam generating tubes so as to pass under superheater tubes and take their weight.

3. An apparatus according to claim 1, wherein the superheater tubes comprise coils arranged in horizontal planes and the portions of the steam generating tubes traversing the intervening space between the two banks of steam generating tubes are horizontally arranged.

In testimony whereof I have signed my name to this specification.

HAROLD EDGAR YARROW.