Jan. 4, 1938. F. I. EPLEY 2,104,155

SUPERHEATER

Filed Sept. 25, 1934

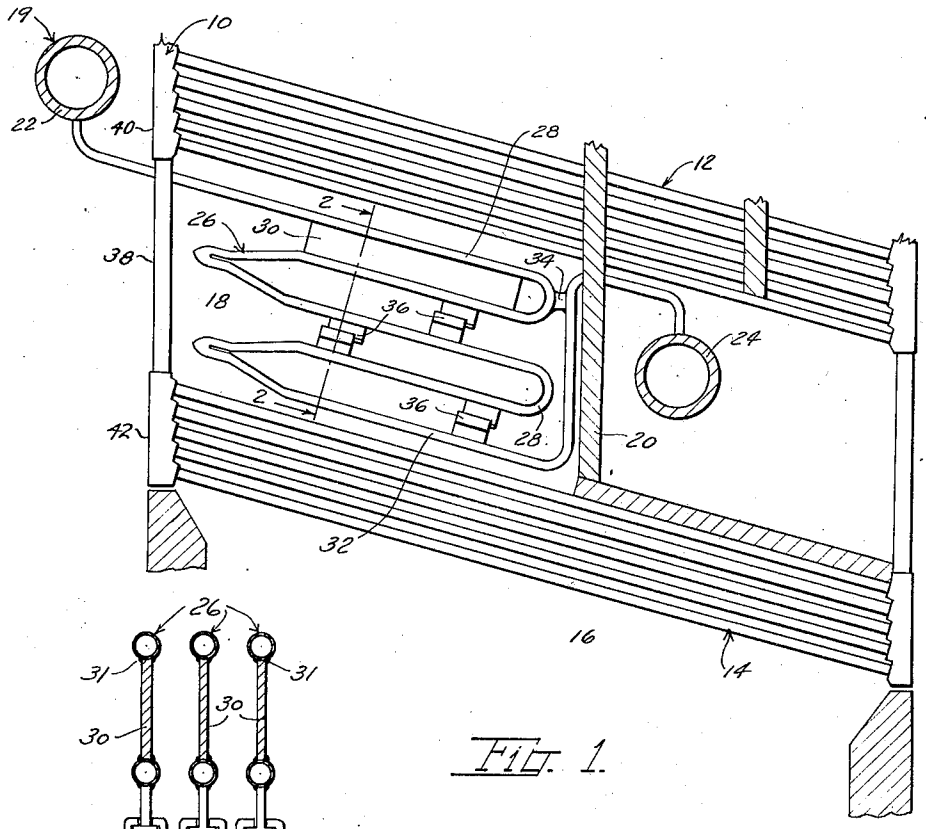


Fig. 1.

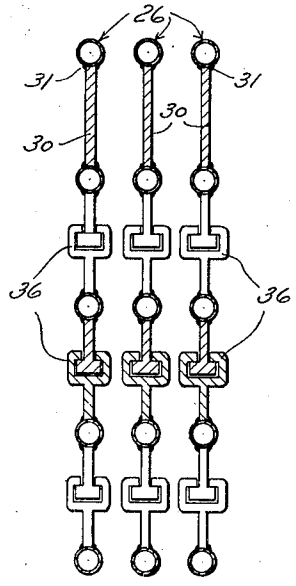


Fig. 2.

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Patented Jan. 4, 1938 2,104,155

UNITED STATES PATENT OFFICE

2,104,155

SUPERHEATER

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Application September 25, 1934, Serial No. 745,415

1 Claim. (Cl. 122—476)

My invention relates to a superheater and a form of unit therefor whereby a material proportion of the weight of the units may conveniently be transferred to the headers to thereby reduce either the cost of high temperature unit supports or the amount of weight on the boiler structure or both.

In order that my invention may be fully and readily understood, I will now describe in detail and in connection with the accompanying drawing a superheater boiler in accordance with my invention and selected by way of example from a number of possible embodiments thereof. In the drawing,

Fig. 1 is a vertical sectional view of a superheater boiler whose superheater is designed in accordance with my invention.

Fig. 2 is a fragmentary section on the line 2—2 of Fig. 1.

The arrangement illustrated in the drawing comprises a portion 10 of a well-known type of horizontal straight tube boiler including an upper group 12 of generating tubes spaced vertically above the lower group 14 of generating tubes, group 14 being set above the furnace chamber 16 in the usual manner. Between group 12 and group 14 is a chamber 18 at least part of which is commonly utilized for a superheater 19. As illustrated, the chamber 18 between the two groups 12 and 14 is divided by baffling 20 into a plurality of gas passes and I have utilized only the first pass for the superheater units. The superheater 19 comprises two headers 22 and 24, the former being shown outside the boiler structure and the latter in the gas space behind the baffling 20. However, I do not limit myself to any particular arrangement of the headers. Between headers 22 and 24 are connected a plurality of serpentine units 26, 26 each of which includes a plurality of loops 28, 28. Units 26 lie in vertical planes so that the loops 28 of a given unit lie one above the other and I have utilized this arrangement to improve the manner of supporting the units. As illustrated, the top loop 28 is employed as a girder being reinforced so as to support the weight of the loops below it. For this purpose, I have shown a plate 30 preferably of mild steel between the two pipe runs of the top loop 28 of each unit, plate 30 being welded or otherwise securely fixed to the pipe runs of top loop 28 at a sufficient number of points to stiffen the top loop so that it can act as a girder. As shown, bodies of weld metal 31, 31 are shown between the plate 30 and the top loop 28 for the entire length of such plate, but I do not limit myself to this.

It will be seen that the top pipe run of the top loop 28 extends out to header 22 so that weight carried by such top loop is transmitted readily by the pipe to the header. In order to transfer the weight from the other end of the top loop 28 to header 24, the bottom run 32 of each unit is extended up along one side of the unit and the end of the top loop opposite header 22 is fixed to such extension of the pipe length 32, weld metal 34 being shown for this purpose. From the point of connection 34, pipe 32 is extended to the header 24 thereby transmitting the weight on the top loop 28 in part to such header. Between the top loop 28 and the pipes below it, I have shown a series of dovetailed supports 36, 36, commonly known as slip spacers, for transmitting the weight of the lower loops to the upper one. Such slip spacers are in common use and, while considered the most convenient means available for the purpose mentioned, I do not limit myself to such a type of support.

In the arrangement illustrated, the entire weight of the superheater is shown as carried on the headers 22 and 24. Except in the case of light units such an arrangement may involve an increase in weight of metal in the headers and sometimes auxiliary supports will need to be employed to transmit some of the weight to the boiler structure. In any event, my invention permits the elimination of uncooled supporting structures in the hot gas zone necessitating heat-resisting metal having a high price per pound. This will be seen to follow from the fact that the parts 30, 34 and 36 of the structure are all cooled by the direct or intimate contact of the metal in the units 26 and any auxiliary supports which may be needed can be placed either in the cooler gas zone back of the baffling 20 or can be clamped to the connecting nipples 38 extending between the upper and lower groups 40 and 42 respectively of boiler headers.

What I claim is:

In a superheater having a pair of horizontally spaced, parallel headers and heat absorbing units each comprising vertically spaced pipe runs serially interconnected by return bends to form substantially horizontally extending loops; stiffening means fixed between the pipe runs of the topmost loops of a unit to form a girder thereof which is located intermediate said headers; means for freely suspending the loops below said topmost loop from said girder; and means for supporting said girder from said headers comprising a lead connecting the topmost loop to one of said headers and a connection between the return bend of said topmost loop and a lead extending from the lowermost loop to the other header.

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