Feb. 18, 1941. W. RIEGER 2,232,272

TUBULAR HEAT EXCHANGE ELEMENT

Filed Oct. 24, 1939

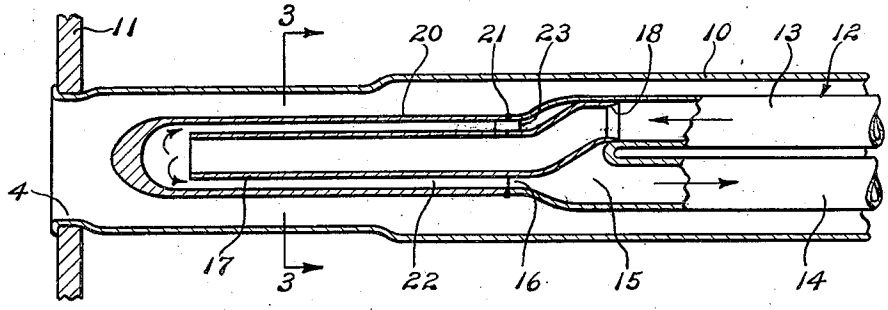


Fig. 1

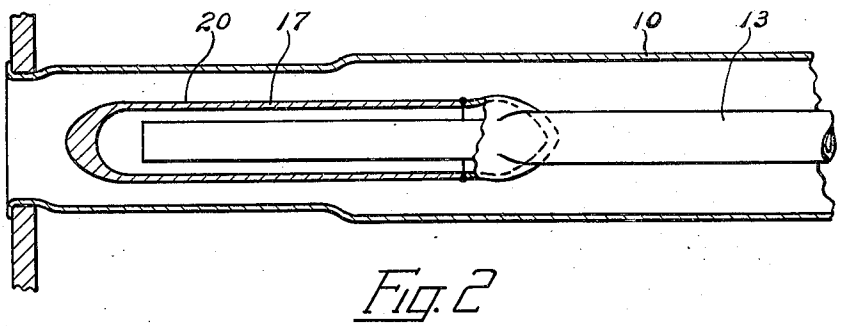


Fig. 2

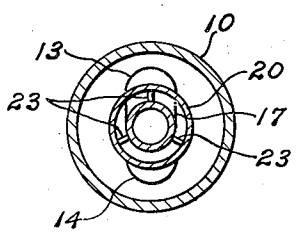


Fig. 3

INVENTOR
WILHELM RIEGER
BY
ATTORNEY

Patented Feb. 18, 1941 2,232,272

UNITED STATES PATENT OFFICE

2,232,272

TUBULAR HEAT EXCHANGE ELEMENT

Wilhelm Rieger, Kassel-Wilhelmshohe, Germany, assignor to The Superheater Company, New York, N. Y.

Application October 24, 1939, Serial No. 300,941
In Germany October 12, 1938

3 Claims. (Cl. 257—254)

The present invention relates to improvements in tubular heat exchange elements such as those utilized in superheaters. The invention consists essentially in providing an element made up of a pair of parallel pipes connected for serial flow by a return bend with an extension in the nature of a "Field tube."

The invention will best be understood upon reference to the following detailed description when read in conjunction with the accompanying drawing in which

Fig. 1 is a vertical sectional view through part of a boiler flue having therein a tubular heat exchange element embodying the invention;

Fig. 2 is a similar horizontal view, and

Fig. 3 is a cross sectional view on the line 3—3 of Fig. 1 .

In the drawing the numeral 10 designates part of a boiler flue having one end connected to a flue sheet 11. Mounted in the flue 10 so as to be exposed to the heat of gases travelling therethrough is a superheater element designated as a whole by the numeral 12. The element 12 consists of a pair of parallel metallic pipes 13 and 14 connected by a breeches piece 15. Instead of being closed to form a return bend, as in a conventional looped element, the breeches piece 15 has an opening 16 at its end. A tube 17 having an external diameter smaller than the cross section of opening 16 (so as to leave an annular passage) extends therethrough and into the pipe 13. In joining the tube 17 to the pipe 13 its end portion is scarfed and brought to a red heat before inserting it into the pipe 13. The tube 17 projects a substantial distance beyond the end of the breeches piece 15 and is surrounded by a larger concentric tube 20 suitably closed at its outer end. Tube 20 is joined to the breeches piece 15 about the opening 16 in its end, the end of the tube 20 preferably being welded to the metal at the periphery of the opening 16. Spacing and supporting members 23 may be tack welded to the tube 17. The interior of the tube 17 may be placed in communication in various ways with the annular space 22 between the tubes 17 and 20. As shown herein, this is brought about by making the tube 20 of greater length than the projecting portion of the tube 17.

When the element is employed as a superheater tube, steam flows through the pipe 13 in the direction of the arrow and thence through tube 17, the annular space 22, the space between tube 17 and the wall of breeches piece 15 and from the latter into the pipe 14.

In constructing new elements of this type the pipes 13 and 14 may be joined by well known methods so as to form a breeches piece 15. Then instead of closing the end of the breeches piece as is done to fabricate a conventional type of superheater element the tubes 17 and 20 are joined as described above. The outer end of tube 20 may be closed either before or after joining it to the breeches piece. To extend the amount of heat transfer surface in an existing heat exchange element made up of parallel pipes connected by a return bend, the end of the return bend is cut off transversely and the tubes 17 and 20 then connected as described above.

What I claim is:

1. A heat exchange element for use in a boiler flue comprising; a pair of parallel tubes; an open-ended breeches piece connecting said tubes at the ends thereof that are adapted to be located within the flue; a tube having one end extending through said breeches piece into one of said pipes and so joined thereto that its interior forms a continuation of the fluid passage of said pipe, said tube being smaller in cross section than the opening in said breeches piece and projecting from the latter; a second tube closed at one end surrounding the projecting portion of said first tube and joined at its other end to said breeches piece about the opening in the end thereof, said second tube being in communication with the interior of said first tube and being of larger diameter to form a passage between said tubes in communication with the interior of the other of said pipes via the space between said first tube and breeches piece and the interior of the latter.

2. A heat exchange element for use in a boiler flue comprising; a pair of parallel tubes; an open-ended breeches piece connecting said tubes at the ends thereof that are adapted to be located within the flue; a tube having one end extending through said breeches piece into one of said pipes and so joined thereto that its interior forms a continuation of the fluid passage of said pipe, said tube being smaller in cross section than the opening in said breeches piece and projecting from the latter; a second tube closed at one end surrounding the projecting portion of said first tube and joined at its other end to said breeches piece about the opening in the end thereof, said second tube being longer than said first tube so that their interiors communicate and being of larger diameter than said first tube to form a passage between said tubes communicating with the interior of the other of said pipes via the

space between said first tube and breeches piece and the interior of the latter.

3. A heat exchange element for use in a boiler flue comprising; a pair of parallel tubes; an open-ended breeches piece connecting said tubes at the ends thereof that are adapted to be located within the flue; a tube closed at one end and having its opposite end joined to said breeches piece about the opening in the end thereof; a second tube extending concentrically through the interior of said first tube into one of said pipes and having its end so joined to the latter that the interiors of said pipe and tube form a continuous fluid passage, said second tube being smaller in diameter than the opening in said breeches piece and projecting through the latter to a point adjacent the closed end of said first tube so that the interior of said one pipe communicates with that of the other pipe via said second tube and the space between it and the first tube.

WILHELM RIEGER.