Jan. 14, 1941. H. N. HACKETT 2,228,953

ELASTIC FLUID GENERATOR

Filed July 26, 1938

Fig. 1.

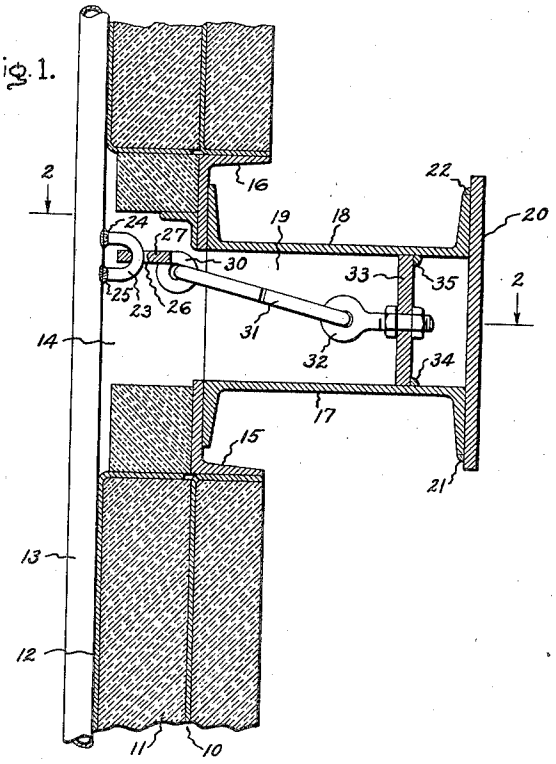
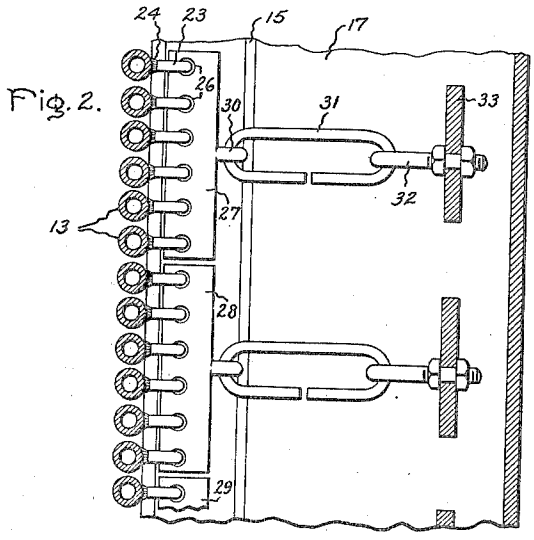


Fig. 2.



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ELASTIC FLUID GENERATOR

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5 Claims. (Cl. 122—235)

The present invention relates to elastic fluid generators including a plurality of heating elements in the form of tubes arranged along the wall of a furnace and supported thereon. More specifically, the invention relates to arrangements for guiding or supporting heating tubes or elements on the walls of an elastic fluid generator or boiler. The tubes are ordinarily made of ferrous metal or steel while the boiler walls are made from heat-insulating material. The materials from which the walls and the heating elements are made have different coefficients of expansion. Therefore provision must be made to permit the heating elements to expand relatively to the boiler wall. This is important especially in modern high temperature, high pressure boilers in which liquid, such as mercury, is heated at temperatures of the order of 1000° F. and more.

The object of my invention is to provide an improved construction and arrangement of supporting boiler heating tubes lining the walls of a furnace or combustion chamber.

For a consideration of what I believe to be novel and my invention, attention is directed to the following description and the claims appended thereto in connection with the accompanying drawing.

In the drawing, Fig. 1 illustrates a sectional view of a mercury boiler partly broken away, and Fig. 2 is a view along line 2—2 of Fig. 1.

The arrangement comprises a wall 10 made of insulating material 11 covered by sheet metal 12 on the side adjacent to and forming a combustion space. The side is covered with a plurality of substantially vertically disposed heating tubes 13 lining the wall and forming what is known as a wall screen. During operation fluid to be heated and evaporated is conducted to one end of these tubes and discharged from the other end thereof.

In order to support the tubes on the wall and at the same time permit relative expansion between the wall and the tubes I provide in accordance with my invention flexible supporting means connected at one end to the tube or tubes and anchored at the other end on the wall. In the present arrangement the wall forms an opening 14 extending at right angles to the tubes 13 substantially along the entire wall. Anchoring means are secured to the outer portion of the wall. These anchoring means include two angle-irons 15 and 16 fastened to the walls on opposite sides of the opening 14 and to U-irons 17 and 18, each having a leg secured to the angle-irons 15 and 16 respectively, thus forming an anchoring channel 19 which constitutes an extension of the opening 14. This channel is closed by means of a cover plate 20 secured to the U-irons 17 and 18 by welds 21 and 22 respectively. The tubes 13 are divided into groups which are separately anchored to the channel 19. To this end a U-iron or eyelet 23 is secured to each tube by welds 24 and 25 uniting the ends of the legs of each eyelet with a tube. The eyelets of the groups project through openings 26 of connecting or guide plates 27, 28, 29. The openings 26 are somewhat larger than the cross-section of the eyelet to permit slight relative movement among the individual tubes of each group. Each guide plate has a ring 30 linked or connected by a link 31 to an eye bolt 32 which is rigidly secured to a plate 33. The plates 33 are secured to the U-beams 17 and 18 by welds 34 and 35. During operation of the links 31 permit movement of the groups relative to the furnace wall, and the guide plates with the eyelets 23 permit relative movement among the individual tubes of each group.

Thus, with my invention I have accomplished an improved construction and arrangement whereby intermediate portions of heating tubes in a boiler are connected or linked to the boiler wall by linking or chain means, thus guiding the tubes and permitting expansion of the tubes relative to the wall and relative to each other.

Having described the method of operation of my invention, together with the apparatus which I now consider to represent the best embodiment thereof, I desire to have it understood that the apparatus shown is only illustrative and that the invention may be carried out by other means.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. Elastic fluid generator comprising a wall, heating elements in the form of a plurality of vertical tubes lining the wall and directly exposed to radiant heat, and link means yieldingly supporting and guiding the tubes on the wall to permit expansion of the individual tubes relative to the wall and relative to each other, said link means including a guide plate loosely connected to each of a group of tubes.

2. Elastic fluid generator comprising a wall, a plurality of vertical heating tubes each having an eyelet lining one side of the wall and directly exposed to radiant heat, and chain means engaging the eyelets and anchoring the tubes on the wall to permit expansion of the individual tubes relative to the wall and relative to each other.

3. Elastic fluid generator comprising a wall

having an opening, a plurality of substantially parallel and vertically disposed heating tubes lining the wall and exposed to radiant heat, and anchoring means supporting the tubes on the wall and permitting expansion of the individual tubes relative to the wall and relative to each other, said anchoring means comprising a channel forming an extension of the opening and a plurality of chains connected at one end to the tubes and anchored at the other end to the channel.

4. Elastic fluid generator comprising a wall having an opening, a plurality of substantially parallel heating tubes lining the wall, and anchoring means supporting the tubes on the wall and permitting expansion of the tubes relative to the wall, said anchoring means comprising a channel forming an extension of the opening, guide plates, means loosely and separately connecting each guide plate to each of a group of tubes and means linking each guide plate to the channel.

5. Elastic fluid generator comprising a wall having an opening, a plurality of substantially parallel vertically arranged heating tubes lining the wall, and anchoring means supporting the tubes on the wall and permitting expansion of the tubes relative to the wall and relative to each other, said anchoring means comprising an eyelet for each tube, a guide plate having a plurality of openings loosely linked to the eyelets of a group of tubes, a link and eye bolt connected to each guide plate, and a channel forming an extension of the opening and supporting the eye bolts.

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