

June 26, 1934.

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1,964,100

HEADER AND METHOD OF FORMING THE SAME

Filed Jan. 19, 1932

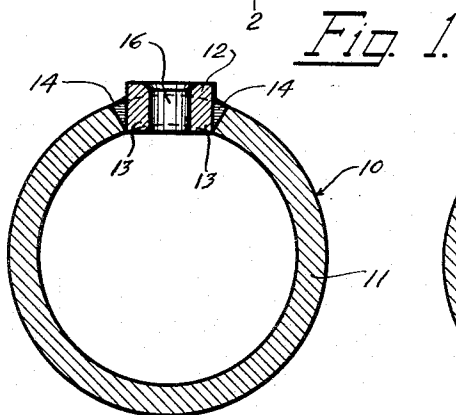
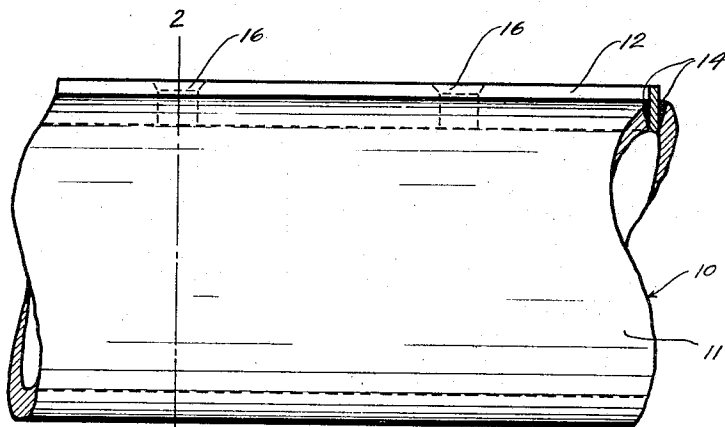


Fig. 2.

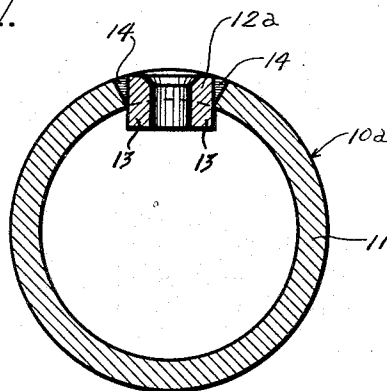


Fig. 3.

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1,964,100

HEADER AND METHOD OF FORMING THE SAME

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Application January 19, 1932, Serial No. 587,514

6 Claims. (Cl. 29—157.4)

My invention relates to apertured headers such as are used in superheaters, reheaters, feed water heaters and other types of heat exchangers.

Headers of the type having apertures or ports permitting the flow of fluid to or from tubular units always suffer from the difficulty that metal must be removed from the wall of the header to provide the apertures, thereby weakening the wall against internal pressure. Furthermore, the tubular elements to be connected to the header are drawn against the mouths of apertures in the header by means of bolts and the holes for the bolts remove further amounts of metal from the wall of the header. It has been proposed to avoid this difficulty in several ways. In Patent #1,692,154, the header wall is made thicker on one side than on the other by boring a solid bar somewhat eccentrically. In Patent #1,363,713 an internal bar is placed within the header.

While the arrangements of the above-mentioned patents have been used with a great deal of success, the eccentric header is naturally quite expensive and the bar headers of the above-mentioned Patent #1,363,713, sometimes develop leaks along the bolt threads.

It is the principal object of my invention to provide an apertured header capable of being manufactured readily and economically and which will also be free from tendency to develop leaks.

The novel features of my invention are pointed out in the appended claims. In order, however, that the invention may be fully and clearly understood, I will now describe in detail in connection with the accompanying drawing two forms of my invention selected by way of example from a number of possible embodiments thereof. In the drawing,

Fig. 1 is an elevational view of a portion of a header within my invention.

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

Fig. 3 is a cross section of a modified form of header.

Referring more particularly to Figs. 1 and 2, 10 is a header having a wall of substantially uniform thickness throughout the larger portion 11 of its circumference. For a relatively short portion of the perimeter of the wall of header 10, such wall is thickened as shown in the section or portion 12. Portion 12 is not originally in one piece with the remaining portion 11 of the wall of the header. Portion 12, however, extends parallel to the axis of the header and is united to the portion 11 by two bodies of weld metal 14, 14 one on each side of portion 12. It will be seen that the inner corners of the edges of portion 11

contact with the longitudinal sides of the portion 12, the edges of portion 11, however, forming an outwardly opening acute angle or V with the sides of the portion 12, the bodies of weld metal 14 occupying such V-shaped spaces. Such V-shaped spaces are formed very conveniently by selecting a portion 12 which is of rectangular section and arranging the edges of section 11 radially, although I do not limit myself to this.

The portion 12 is provided with a plurality of apertures 16, 16 arranged in a row centrally of the bar portion 12 and whereby fluid may pass into or out of the header 10 to connecting tubular members, not shown. As clearly appears in Figs. 2 and 3, bar 12 is much thicker than portion 11 of the header and the bar is also enough wider than the apertures 16 so that a thick reinforcing strip 13 is left on each side of the row of apertures 16, strips 13 serving as trusses to support the stresses on bar 12. As shown, the strips 13 together have a thickness slightly greater than the diameter of the apertures 16. I do not limit myself to this, however. In the header 10, shown in Figs. 1 and 2, the portion 12 projects beyond the outer surface of portion 11. In the header 10A shown in Fig. 3, the portion 12A projects internally of the portion 11. Otherwise the structure of Fig. 3 is the same as that of Figs. 1 and 2. In both forms, the bar 12 makes pronounced shoulders with portion 11. In the arrangement of Fig. 2 the angle between the bar 12 and the portion 11 is obtuse whereas the arrangement shown in Fig. 3 the angle between these two parts is internal and acute.

In the process of making the header hereinabove described, a heavy skelp adapted to form the portion 11 of a header and having its edges at right angles to its flat sides is bent into a partial cylinder with the edges of the skelp diverging outwardly and leaving a gap in the wall of the cylinder. The gap so provided is closed by a bar having a rectangular cross-section and adapted to form the portion 12 of a header such as 10. The sides of such bar lie in substantial contact with the inner corners of the edges of the skelp. The edges of the skelp diverging outwardly whereas the sides of the bar are parallel, outwardly opening V-shaped spaces are thus provided between the edges of the skelp and the sides of the bar. Such V-shaped spaces are then filled with weld metal to unite the skelp and bar firmly together to form a header. The weld metal may be supplied by any convenient method of which there are a number in use well adapted to the purpose, such as the various methods of electric arc weld-

ing, acetylene welding, and others. Preferably the bar is drilled to provide apertures therethru before being incorporated into a header.

What I claim is:

- 5 1. The process of forming headers which comprises bending a skelp having a rectangular cross-section into a partial cylinder having the edges of the skelp spaced apart and diverging outwardly, filling the gap between said diverging edges of
10 the skelp with a substantially rectangular bar of greater thickness than the skelp and provided with a central row of apertures and having parallel sides forming, with edges of the skelp, outwardly opening V shaped notches, filling said
15 notches with weld metal other than metal from said bar to unite said bar to said skelp to form a header, said apertures being formed in the bar before it is incorporated in the header.

- 20 2. The process of forming headers which comprises bending a skelp into a partial cylinder having the edges of the skelp spaced apart and diverging outwardly, filling the gap between said diverging edges of the skelp with a bar of substantially rectangular cross-section of greater thickness than the skelp and having parallel sides
25 forming, with the edges of the skelp, outwardly opening V shaped notches, making a series of apertures along the center line of said bar and leaving thick strips of the bar along both sides of the row of apertures, and filling said notches
30 with weld metal to unite said bar to said skelp to form a header.

- 35 3. The process of forming headers provided with aligned apertures and having high strength along the line of aperture which comprises bending a skelp into a partial cylinder having the edges

of the skelp spaced apart and diverging outwardly, inserting into the gap between said diverging edges of the skelp an apertured bar of substantially rectangular cross-section and much wider than the diameter of said apertures and enough thicker than said skelp to form pronounced shoulders along the lines where the skelp approaches the bar, and welding said bar to said skelp to form a header.

4. A header having a wall portion in the form of a partial cylinder having edges which are spaced apart, a relatively heavy bar between the edges of said wall portion, said bar having a series of apertures along its center line for passage of fluid, a weld joint uniting said bar and portion, said bar being substantially rectangular in cross-section and sufficiently thicker than said wall portion to form pronounced shoulders at said joints and also wide enough to have thick reinforcing strips outside the apertures.

5. A header as set forth in claim 4 and in which the bar projects inwardly of the header to form acute angles with the inner surface of the wall portion.

6. A header having a wall portion in the form of a partial cylinder having edges which are spaced apart, a relatively heavy bar between the edges of said wall portion, said bar having a series of apertures for passage of fluid, and weld joints uniting said bar and edges, said bar being sufficiently thicker than said wall portion to form pronounced shoulders at said edges and also wide enough to have thick reinforcing strips outside said apertures.

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