No. 858,100. PATENTED JUNE 25, 1907.

O. S. PEDERSEN.

EXPANSION TUBE.

APPLICATION FILED NOV. 23, 1906.

Fig. 1.

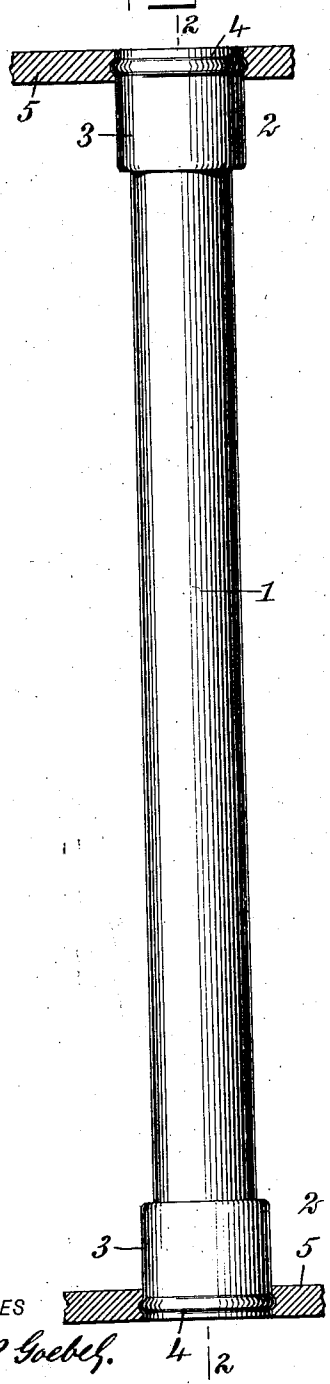
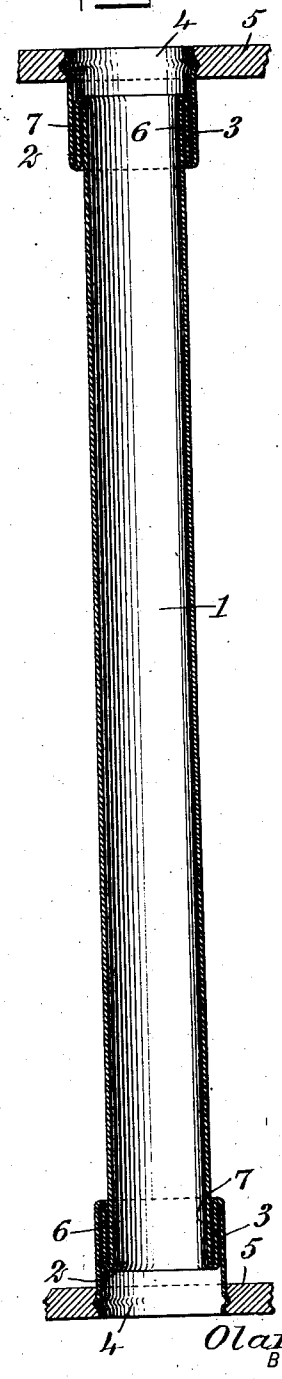


Fig. 2.



WITNESSES

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EXPANSION-TUBE.

No. 858,100. Specification of Letters Patent. Patented June 25, 1907.

Application filed November 23, 1906. Serial No. 344,733.

To all whom it may concern.

Be it known that I, OLAF S. PEDERSEN, a citizen of the United States, and a resident of the city of New York, borough of Brooklyn, in the county of Kings and State of New York, have invented a new and Improved Expansion-Tube, of which the following is a full, clear, and exact description.

This invention relates to heating tubes, such as used in boilers and feed water heaters.

As is well known to manufacturers of boilers and feed water heaters, condensers, etc., when tubes are mounted between tube sheets in which their ends are fixed, considerable difficulty arises from the contraction and expansion of the tubes longitudinally, tending to make the joints leaky and otherwise defective.

The object of this invention is to produce a heating tube having a form enabling the same to take up the expansion or contraction referred to, without affecting the joints at the ends of the tube.

The invention consists in the construction and form of tube to be more fully described hereinafter and particularly set forth in the claims.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in both figures.

Figure 1 is a side elevation of a tube constructed according to my invention, and showing a portion of the tube sheets in cross section in which the tube is set; and Fig. 2 is a longitudinal central section through the tube and adjacent portions of the tube sheets, on the line 2—2 of Fig. 1.

Referring more particularly to the parts, 1 represents the body of the tube, which is of the usual form. Near its ends, the material out of which the tube is formed is rolled so as to form a crimp 2, said crimp comprising three folds or laps of the material; thus, there is formed an outer fold or lap 3 which extends outwardly to form the head 4 of the tube, which head is mounted in two tube sheets in any suitable manner, such as that shown. There is also formed an inner fold or lap 6, which constitutes a continuation of the body of the tube, and between the inner and outer folds there is an intermediate fold 7 disposed therebetween and integrally uniting the inner and outer folds. Tubes of this form may be readily constructed out of copper or similar material. When the body of the tube elongates or contracts through the changes of temperature, the movements of the ends of the body are taken up by the crimps 2, so that little or no strain is brought upon the heads 4 of the tubes. In this way the joints at the tube sheets are maintained tight and in good working order. The tubes may be evidently readily set in the tube sheets by means of tube expanders, in the usual manner. Tubes of the form described are considered far superior to heating tubes which have simple corrugations formed therein, in order to serve the same general purpose. Tubes having corrugations, as described, cannot be readily cleaned, and offer opportunity for the lodgment of corrosive deposits.

Attention is called to the fact that the expansion crimps in my invention are disposed near the openings to the tubes, which permit of their being readily cleaned, and the bodies of the tubes present a clean unbroken surface which may be readily cleaned by the ordinary methods. When tubes of this general class are formed with corrugations for the general purposes of this invention, these corrugations tend to weaken the tube at the point where they are formed, as they injure the molecular condition and render the material brittle. As a consequence, the tubes become less responsive to changes in temperature. When tubes are formed with the expansion crimps in the manner described above, the expansion of the material to the larger diameter is uniform, so that there is little disturbance of the so-called "grain" of the tubes, and for this reason the normal strength of the tube is not diminished; the tube appears to be, in fact, strengthened at or near its extremities where the expansion crimps are formed, as the outer layers of the material operate as reinforcing rings.

Tubes constructed as described may be used to conduct gases of combustion, steam or air, and they may be used as water tubes or for conducting any other liquid.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. A tube of the class described, having an expansion crimp extending continuously thereabout, presenting three layers of material, and formed intermediate of the ends thereof.

2. A tube of the class described, having an expansion crimp extending continuously thereabout by doubling the wall of the tube longitudinally upon itself, whereby three layers of material are formed at the wall of the tube, intermediate of the ends thereof.

3. A tube of the class described, having an expansion crimp extending continuously thereabout, presenting three layers of material, and tube sheets receiving the ends of said tube.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

OLAF S. PEDERSEN.

Witnesses:
F. D. AMMEN,
JNO. M. RITTER.