

(No Model.)

F. HOHLFELDER.  
BOILER TUBE FERRULE.

No. 558,952.

Patented Apr. 28, 1896.

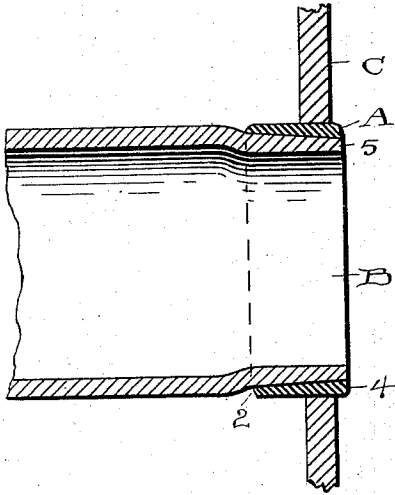


Fig. 1.

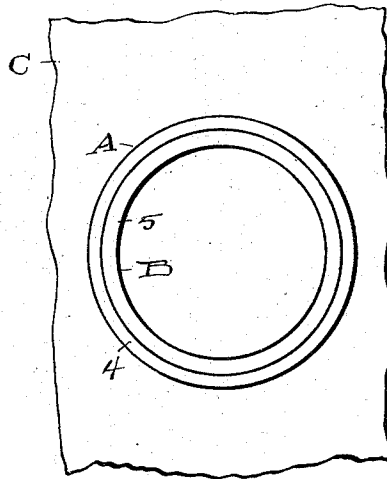
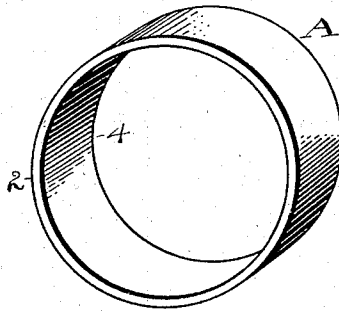


Fig. 2.

Fig. 3.



ATTEST.  
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# UNITED STATES PATENT OFFICE.

FREDERICK HOHLFELDER, OF CLEVELAND, OHIO.

## BOILER-TUBE FERRULE.

SPECIFICATION forming part of Letters Patent No. 558,952, dated April 28, 1896.

Application filed August 14, 1895. Serial No. 559,234. (No model.)

*To all whom it may concern:*

Be it known that I, FREDERICK HOHLFELDER, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Thimbles or Ferrules for Boiler-Tubes; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

My invention has reference to thimbles or ferrules for boiler-tubes; and the object of the invention is to provide a thimble or ferrule which will absolutely prevent leakage and at the same time serve to fix the tube firmly in its support, all as hereinafter fully described, and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a longitudinal sectional elevation of a section of a tube and a section of the end boiler plate or head in which the tube is supported, and disclosing the peculiar construction of said tube at this point and of the ferrule which envelops the end of the tube. Fig. 2 is a front elevation of the parts shown in Fig. 1, and Fig. 3 is a perspective view of my new style of ferrule.

It is of course well known to me that in any broad sense it is not new to employ ferrules of a ductile and sensitive metal or material as a bushing or packing, so to speak, for boiler-tubes, for ferrules have been long used and their advantages are well known; but there are advantages of construction in ferrules for this purpose which I have discovered which render the ferrule more effective than heretofore and materially add to its value, as will now appear. Thus in Fig. 3 I show a perspective view of my improved ferrule A.

Referring to Fig. 1, where it is shown in cross-section, it will be seen that the ferrule is of exactly the same size in cross-section at all points between its inner edge 2 and its outer edge 4 when measured from outer surface to outer surface at each end, or what may be termed the "outside" diameter, while on the inside it is tapered from edge 4 to edge 2 in degree equal to about half the thickness as edge 4. I make the inside slightly divergent or flaring. Then in order to adapt the ferrule thus constructed to the boiler-tube B, I swage or contract the end of the tube in the same proportion of degree as the taper on the

inside of ferrule A. This enables me to use a hole through the head C of the boiler which is the same size as the tube before its reduction, and has the very material and important advantage, by reason of its shape, of forming a close contact both over the reduced and tapered extremity 5 of the tube B and in the hole or opening therefor in the head C. This advantage goes to the essence of the invention, because the sole purpose of using ferrules of a ductile nature is to overcome the well-known difficulty of effecting or making a joint between the tube B and head C with the tube alone which will not leak. A ductile and sensitive metal, like copper, will respond to heat much more quickly than iron, and hence if put in position and made tight when cold will necessarily be tight when heated; but in case of my construction of ferrule if any leakage were to manifest itself on either side of the ferrule I can remedy it by simply driving the ferrule closer, as may be needed. This inside taper of the ferrule furthermore makes the ferrule accommodate itself to any slight inequalities on the tube, which could not occur if their surfaces were plane and straight, as heretofore.

In case the ferrule be applied to old boilers or boilers already in position and to be repaired it is customary to ream out the boiler-head where the tube comes and then introduce ferrules of a size to suit the hole that has been made. Usually these holes are made somewhat considerably larger than originally, and then of course a correspondingly heavier ferrule is required.

What I claim is—

1. The ferrule described tapered from its outer to its inner edge on its inside, in combination with a boiler-tube having a tapered and contracted end encircled by said ferrule, substantially as set forth.

2. The boiler-tubes described having their ends contracted and tapered on their outside, in combination with ferrules tapered on their inside and fitting about the ends of said tubes and the plate of the boiler in which said parts are supported, substantially as set forth.

Witness my hand to the foregoing specification on this 2d day of August, 1895.

FREDERICK HOHLFELDER.

Witnesses:

H. T. FISHER,  
R. B. MOSES.