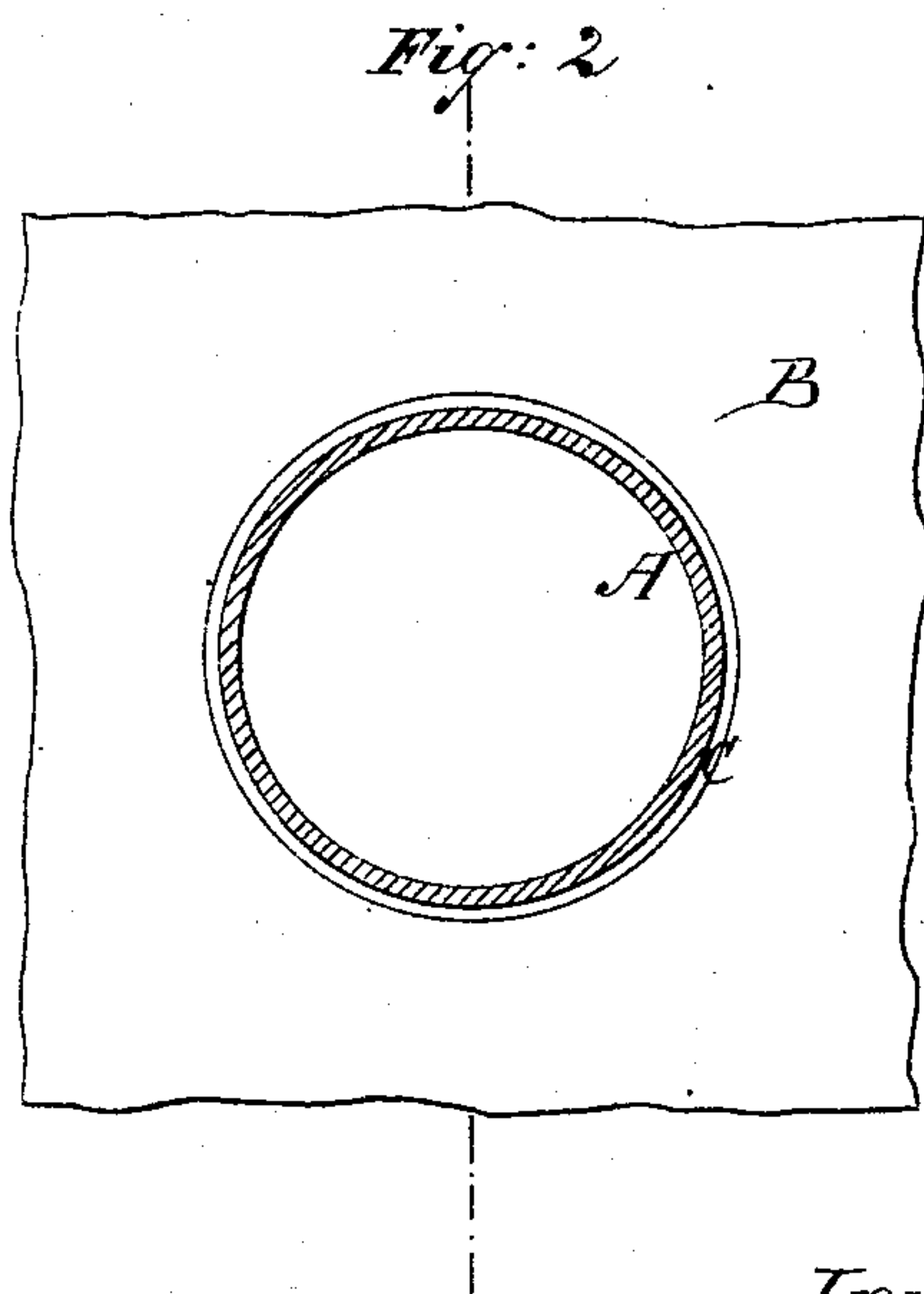
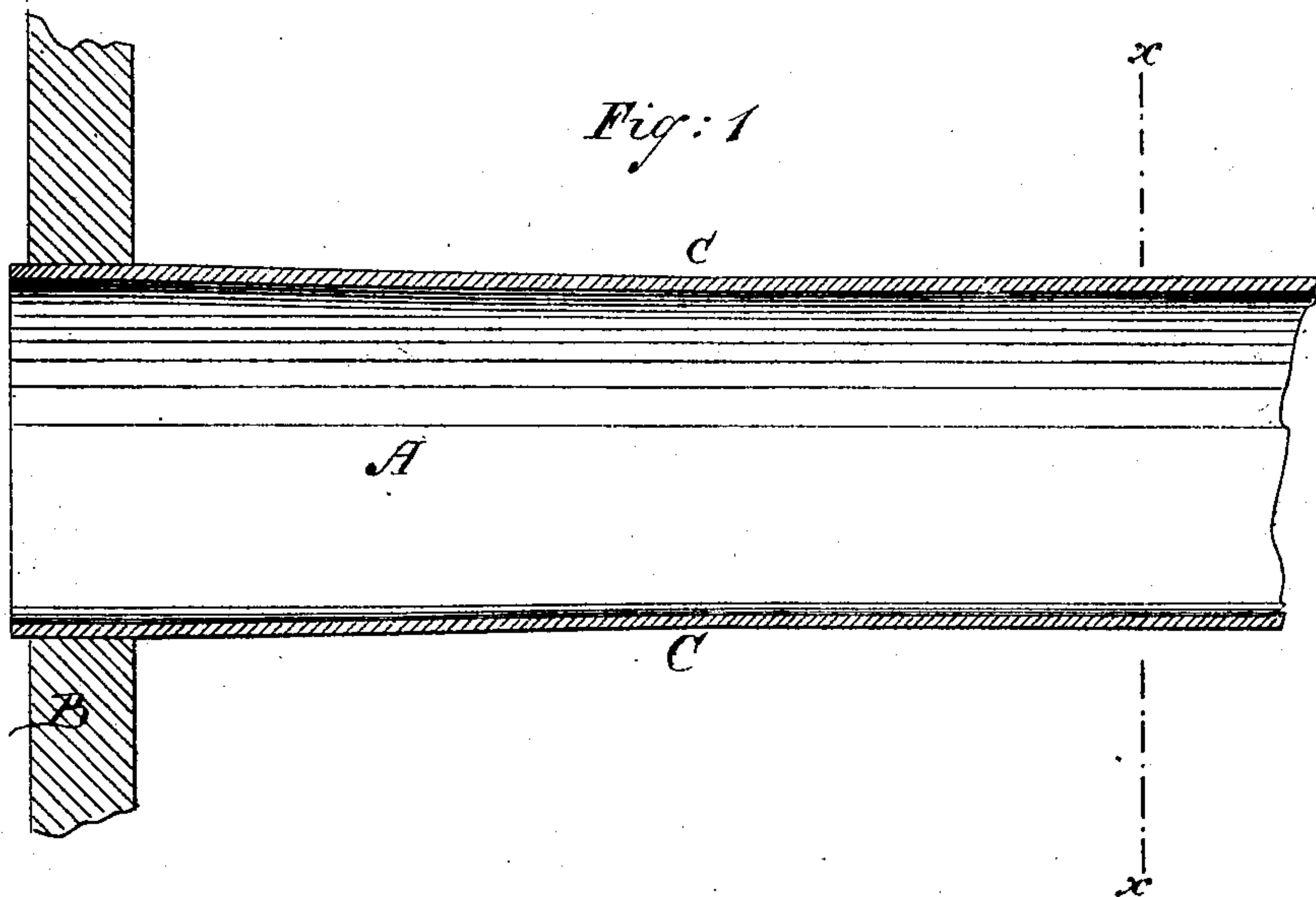


H. S. LANSDELL.

Tubes for Boilers and Kindred Purposes.

No. 149,138.

Patented March 31, 1874.



Witnesses:

Wm. H. Duncanson
Robt. H. Duncanson

Inventor:

Henry S. Lansdell

UNITED STATES PATENT OFFICE

HENRY S. LANSDELL, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN TUBES FOR BOILERS AND KINDRED PURPOSES.

Specification forming part of Letters Patent No. **149,138**, dated March 31, 1874; application filed January 12, 1874.

To all whom it may concern:

Be it known that I, HENRY S. LANSDELL, of Brooklyn, in the State of New York, have invented a new and useful Improvement in Tubes for Boilers and Kindred Purposes, of which the following is a specification:

The object of the present invention is to improve the character of tubes for boilers and kindred purposes, so that they will be the better able to resist the corroding action of the various soluble matters contained in the water ordinarily used for generating steam. To this end I coat the exterior of the tube with nickel, applying this nickel-plating by any of the processes adapted to secure the desired result. In order to receive and retain this plating under the constantly-varying conditions of expansion and contraction to which the tube is subjected in use, the exterior surface of the tube must be prepared with unusual care, being made much smoother than in the ordinary processes of manufacture; and, with a view to secure a maximum of smoothness and a minimum of expansion and contraction, I prefer to make the tube of steel, drawn in a cold state through dies of the requisite form. Such a tube, the mere question of strength aside, will change its dimensions, under varying degrees of temperature, far less than ordinary iron or brass tubes, and, therefore, will be found the best adapted to the purpose sought.

An ordinary unplated boiler-tube is usually made cylindrical throughout, and of an external diameter about equal to the diameter of the holes in the boiler-head. Consequently, to insert it in its place in building or repairing the structure, it must be driven through the head by the application of considerable force, and with such friction against the edge of the hole through which it passes that the surface of the metal is almost necessarily cut and abraded. This would be fatal to the successful workings of the plate-tube; so that it becomes necessary to devise some means of inserting such a tube in its place without injury to the plating. This might be done by making the tube cylindrical throughout, and of such diameter as to allow an easy play be-

tween it and the hole of the boiler-head, and then, after passing it through the hole, expanding it by means of a taper-mandrel against the walls thereof, were it not that this mode of seating the tube, by expanding its ends, would tend to injure the plating upon this portion, the dimensions of which are thus permanently changed; and, in the case of a cold-drawn steel tube, even the metal of the tube itself might be cracked.

To obviate this difficulty I slightly enlarge the end of the tube before plating it, as shown in the accompanying drawing, in which Figure 1 is a longitudinal section of one end of one of my tubes, (shown as passing through the boiler-head,) A being the tube, and B the plate in which it is secured; and Fig. 2 is a transverse section of the tube along the line *xx* of Fig. 1.

It will be seen that, while the body of the tube is cylindrical, and of such diameter as to permit it to pass readily through the head, this diameter gradually and uniformly increases from the point C to the extremity of the tube, being at the last fully equal to that of the hole in which it is to rest, and which it must be made to fit.

A tube thus constructed can be inserted in place without marring or injuring the plating that may have been placed upon its exterior. In order to produce more intimate contact between it and the walls of the hole in which it rests, the ordinary expander may be used to give a slight expansion to the metal after the tube and the head have attained their ultimate relative position; but, on account of the previous tapering of the end of the tube, the expansion thus produced will be so very slight as not to weaken either the plating or the metal composing the tube.

What is hereby claimed as new is—

A tube for boilers and similar uses, enlarged at its extremity, and having its exterior plated throughout, substantially as and for the purpose set forth.

HENRY S. LANSDELL.

Witnesses:

SAMUEL A. DUNCAN,
ROBT. H. DUNCAN.