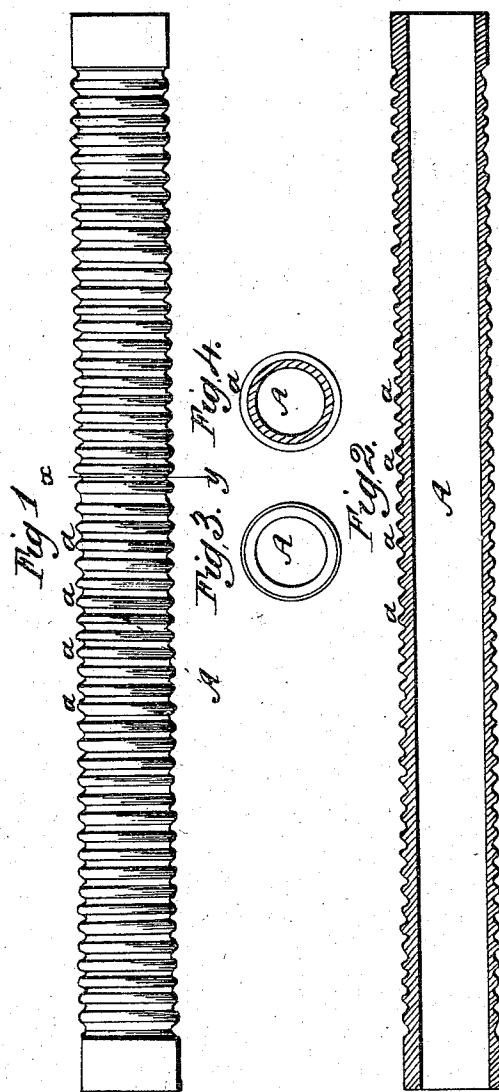


R. C. Bristol,
Steam-Boiler Tube.

N^o 11,409.

Patented Aug. 1, 1854



UNITED STATES PATENT OFFICE.

RICHD. C. BRISTOL, OF CHINA, MICHIGAN.

STEAM-BOILER TUBE.

Specification of Letters Patent No. 11,409, dated August 1, 1854.

To all whom it may concern:

Be it known that I, RICHARD C. BRISTOL, of China, in the county of St. Clair and State of Michigan, have invented certain new and useful Improvements in the Method of Increasing the Radiating-Surface of Tubes or Plates for Steam-Boilers, &c.; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 represents a view of a chased tube. Fig. 2 represents a longitudinal section through the same. Fig. 3 represents an end view, and Fig. 4 represents a transverse section through the red line *x, y*, of Fig. 1.

Similar letters refer to like parts.

This invention is based upon the assumption that heat is increased in proportion to the radiating surface and not in proportion to the fire surface, regardless of the radiating surface, and to distinguish my invention from what has hitherto been done I may mention first that it differs from corrugated plates, inasmuch as corrugations are on both sides of the plate—the plate of uniform thickness throughout, and the corrugations and the bending of the plate into shape must be at one and the same operation, while corrugated tubes, as such, cannot be made at all. By my mode of increasing the radiating surface by chasings, embossings, or projections it can be readily done after the tubes are formed, or if on plates either before or after they are bent into shape. My mode is exclusively confined to one surface of the metal—corrugations must be on both sides. I do not therefore lay any claim to the use of corrugated or folded plates. I would further remark that the manner in which I apply these chased or embossed surfaces differs materially from anything heretofore practised.

In "Hancock's Narrative," Plate 3, pg. 13, are represented and described embossed bars between the flues, in the fire space, for strengthening the tubes. These differ from

my embossings, inasmuch as they are separate from the tube and next the fire instead of the water, and the fire surface, but not the radiating surface, is increased thereby. It does not therefore do what I aim at doing. In the patent of Seth Graham, February 13, 1838, screws are cut upon the ends of the tubes, for the purpose of fastening them into their places, not for increasing the radiating surface. These, too, are in the fire space and not in the water space and do not, if their purpose had been left to conjecture, accomplish what I do. My invention rests upon chasing, embossing, or otherwise roughening that side of the metal next the water, leaving the other side as it is rolled, and thus increase the radiating surface only.

A, represents a tube of the kind claimed, on which *a, a, a, a*, are the ridges or protuberances, which may be concentric, spiral, or longitudinal, or parts of each. They are most easily prepared by placing them in a lathe and running a chaser or bur along them, with a suitable thread, or they may be cut or impressed by any other means. Plates also may be treated by running a tracer or point over their surfaces or rolling them.

Having thus fully described the nature of my invention and shown the difference between it and those to which it bears an apparent resemblance, what I claim therein as new and desire to secure by Letters Patent is—

The cutting, impressing, or otherwise increasing one of the surfaces of tubes, or sheets of metal, which said surface is to form the radiating side of boilers, flues, or vessels, for the purpose of imparting heat to any liquid, vapor, gas, or to atmospheric air when said cutting or impressing is of such a character as to admit of being made after the plates are bent up into form, substantially as described.

R. C. BRISTOL.

Witnesses:

A. B. STOUGHTON,
THOMAS H. UPPERMAN.