

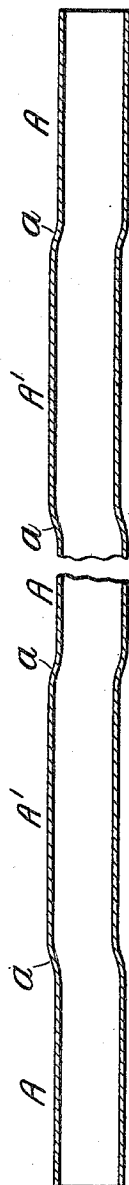
No. 811,016.

PATENTED JAN. 30, 1906.

J. WHYTE & A. M. CROSSLEY.

BOILER TUBE.

APPLICATION FILED JULY 12, 1905.



Witnesses:

C. H. Crawford
H. Waldman

Inventors:

John Whyte
Arthur Mitchell Crossley
by *P. Singer* *Attorney*

UNITED STATES PATENT OFFICE.

JOHN WHYTE AND ARTHUR MITCHELL CROSSLEY, OF GLASGOW,
SCOTLAND.

BOILER-TUBE.

No. 811,016.

Specification of Letters Patent.

Patented Jan. 30, 1906.

Application filed July 12, 1905. Serial No. 269,314.

To all whom it may concern:

Be it known that we, JOHN WHYTE and ARTHUR MITCHELL CROSSLEY, subjects of the King of the United Kingdom of Great Britain and Ireland, residing at Glasgow, Scotland, have invented new and useful Improvements in Boiler-Tubes, of which the following is a specification.

This invention relates to the fire-tubes of locomotive, marine, and like boilers; and it has for its object to insure better absorption of the heat of the fire-gases on their passage through such tubes while also providing extended heating-surface.

In lieu of employing straight tubes, as commonly used in boilers, we construct the tubes in sinuous form, as shown in longitudinal section in the accompanying drawing, each tube being so bent that a number of short portions A A of its length are approximately straight, but out of axial line with alternate short portions A' of its length, these straight parts being united by curved or inclined parts *a*. Thus about a foot of the length of the tube at either end A may be straight. Then a bend *a* may be formed on the tube, and the continuation of its length at A' for the space of another foot may be straight, then a bend *a* formed to bring the next short length into the axial line of the first straight portion, the tube being in like manner sinuously formed

throughout its entire length. The connecting bent or curved portions of the tube are preferably formed to avoid sharp turns or corners, in which soot or dust might be apt to lodge and so that the passage of a cleaning-brush through the tube will properly sweep it out. The sinuous formation above specifically set forth need not, however, be followed in its entirety as long as a stepped or sinuous form is imparted to the tube to provide enhanced surface for impact of the fire-gases and to prevent their direct flow through the boiler-tubes, thus enhancing the water circulation to the very lowest point or level.

Having now described our invention, what we claim, and desire to secure by Letters Patent of the United States, is—

A boiler-tube provided throughout its length with a continuously and axially straight passage said tube having offset sections whose axes are parallel with the axis of said tube, substantially as described.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

JOHN WHYTE.

ARTHUR MITCHELL CROSSLEY.

Witnesses:

WALLACE FAIRWEATHER,
JNO. ARMSTRONG, Junr.