

(No Model.)

G. SINCLAIR.
APPARATUS FOR SUPERHEATING STEAM.

No. 559,623.

Patented May 5, 1896.

FIG. 2

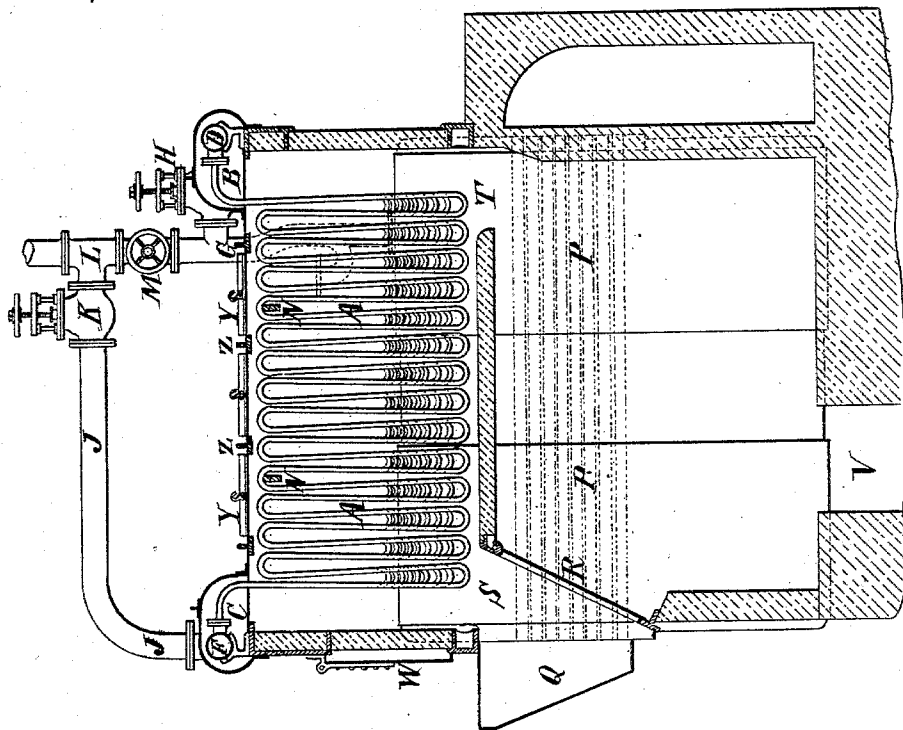
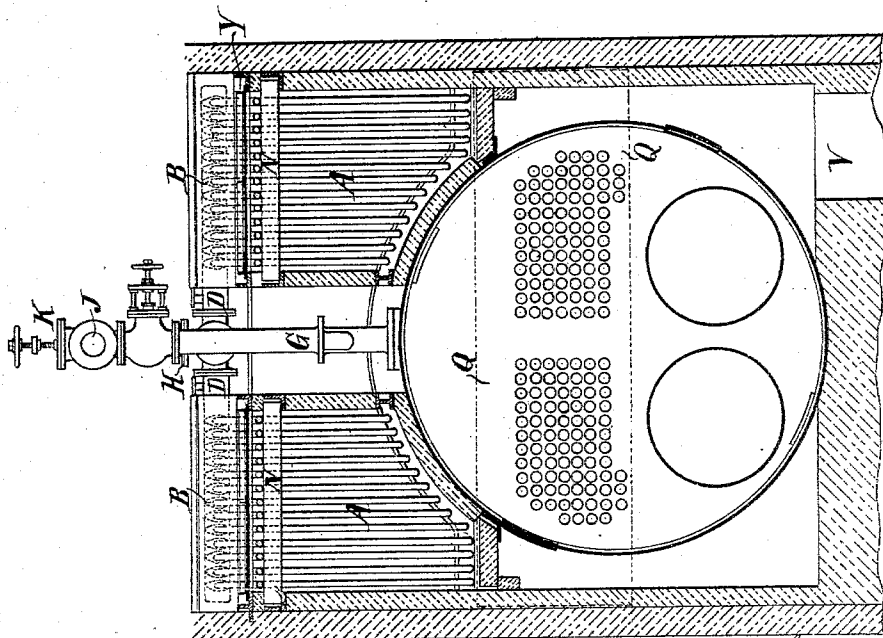


FIG. 1



Witnesses:
E. J. Griswold
L. Menke

Inventor:
George Sinclair
By his attorneys
Horsman and Horsman

UNITED STATES PATENT OFFICE.

GEORGE SINCLAIR, OF LEITH, SCOTLAND.

APPARATUS FOR SUPERHEATING STEAM.

SPECIFICATION forming part of Letters Patent No. 559,623, dated May 5, 1896.

Application filed December 26, 1895. Serial No. 573,367. (No model.) Patented in England August 3, 1894, No. 14,874.

To all whom it may concern:

Be it known that I, GEORGE SINCLAIR, a subject of the Queen of Great Britain and Ireland, and a resident of Leith, in the county of Mid-Lothian, Scotland, have invented certain Improvements in Apparatus for Superheating Steam, (for which I have obtained a British patent, No. 14,874, dated August 3, 1894,) of which the following is a specification.

My said invention has for its object to improve the construction and arrangement of apparatus for superheating steam, and to apply for such purposes in a better manner than heretofore some of the heat remaining in the fire-gases of a steam-boiler after they have acted on the main parts of the boiler itself.

In carrying out my invention I employ long lengths of comparatively small tubing—say of from one to two inches in diameter—and I have each length bent into zigzag loops to form a sheet-like section, such as will lie upon or against a flat surface, but with openings through the loops. The tube of each section or sheet has flanges at its ends for bolting to flanges on a main inlet-pipe and a main outlet-pipe, and a number of the tubular sections or sheets are grouped together and are placed vertically in one or more flues or spaces through which the fire-gases pass.

In order that my said invention and the manner of performing the same may be properly understood, I hereunto append a sheet of explanatory drawings, to be hereinafter referred to, and showing an example of my improved apparatus.

Figures 1 and 2 of the drawings are vertical sections, as at right angles to each other, of my improved apparatus as applied to a horizontal cylindrical land-boiler.

In the drawings the same reference-letters are used to mark the same or like parts wherever they are repeated.

In my apparatus (shown in Figs. 1 and 2 as applied to a horizontal cylindrical boiler with return fire-gas tubes) there are, for superheating the steam, two groups of the tubular sections or sheets placed one on each side of the middle immediately above the curved top of the boiler, and each section consists of a length of small tubing A, bent into zigzag loops with openings through them. Each tube A has flanges B and C at its ends for bolting to flanges on the main inlet-pipe D

and a main outlet-pipe F. Steam is admitted from the boiler into the main inlet-pipe D by means of a pipe G, provided with a stop-valve H, and passing through the tubes A to the main outlet-pipe F goes by a pipe J, provided with a stop-valve K, to a main steam-pipe L. When the tubes A require examination or repair, the steam may be shut off from them by means of the stop-valves H and K and made to pass directly through a stop-valve M to the main steam-pipe L, and then any tubular section or sheet can be disconnected and withdrawn upward without interfering with any other section. The movable covers Y, resting on the brick casing and on transverse I-bearers Z, are provided to allow of the tubular sections A being easily withdrawn. The tubular sections or sheets being vertical are supported at intermediate points on horizontal bars N, extending through some of the upper loops and being fixed into the brick or equivalent casing. The fire-gases pass from the fire-gas tubes P into the smoke-box Q and (the damper R on each side of the boiler having been previously closed) proceed by the opening S into the space inclosing the tubular sections and finally escape by the opening T to the flue V. When it is not wished to use the superheating apparatus, the by-pass dampers R are opened and the fire-gases escape directly to the flue V. Two doors W are provided at the front of the boiler for cleaning purposes.

An important feature of my apparatus is that none of the tube-joints are exposed to the action of the fire-gases.

What I claim as my invention is—

Apparatus for superheating steam, comprising groups of tubes, each of which tubes is bent into zigzag loops to form a sheet-like section, and is bolted to a main inlet and a main outlet pipe, the groups of tubes being placed vertically in one or more flues or spaces through which the fire-gases pass, but without exposure of the joints to great heat substantially as herein set forth.

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

GEORGE SINCLAIR.

Witnesses:

EDMUND HUNT,
DAVID FERGUSON.