

(No Model.)

3 Sheets—Sheet 1.

S. ALLEY.
STEAM BOILER.

No. 587,667.

Patented Aug. 3, 1897.

FIG. 2

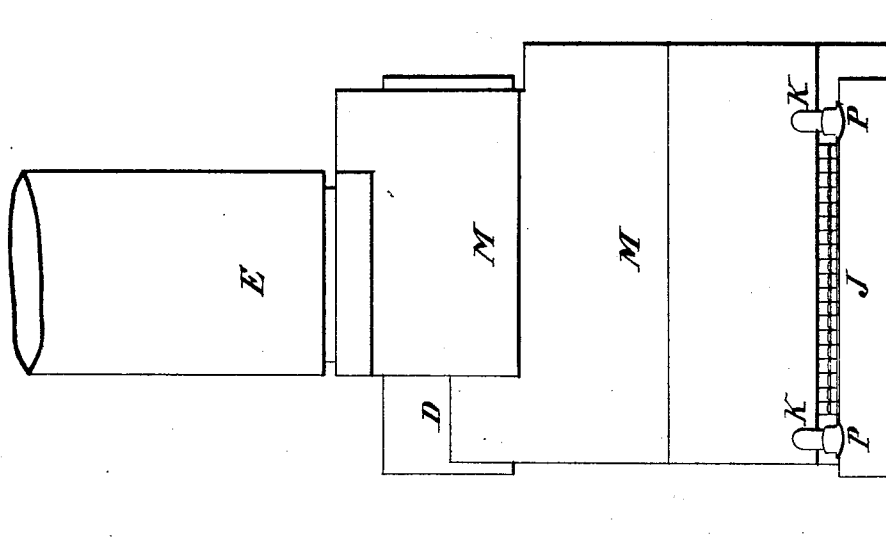
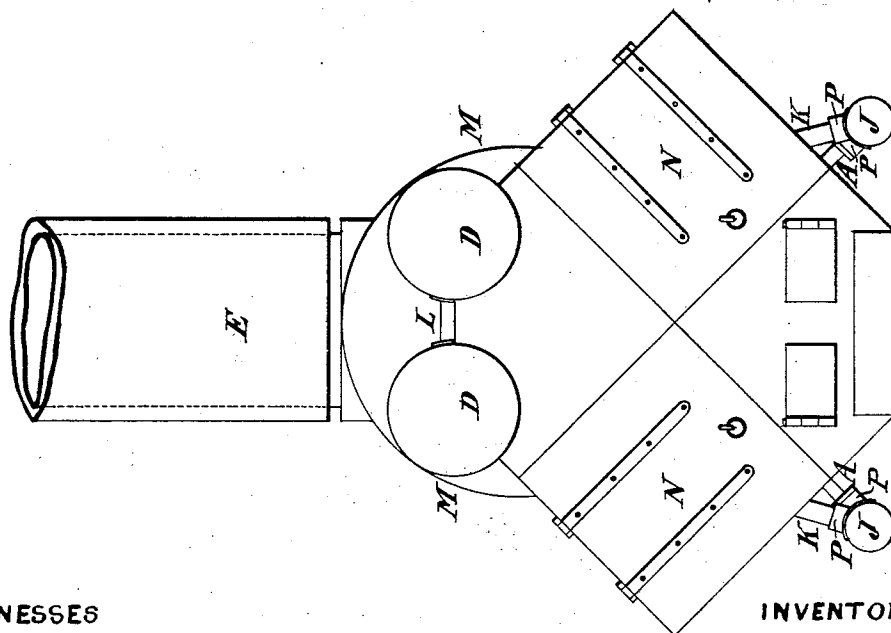


FIG. 1



WITNESSES

P. W. Wright

A. C. Connor

INVENTOR

Stephen Alley

BY

Howson and Howson

HIS ATTORNEYS

(No Model.)

3 Sheets—Sheet 2.

S. ALLEY.
STEAM BOILER.

No. 587,667.

Patented Aug. 3, 1897.

FIG. 4.

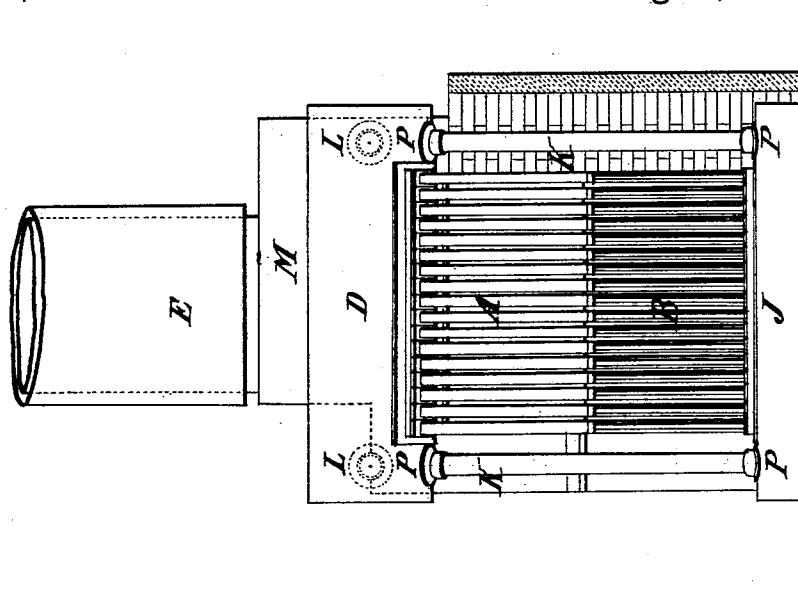
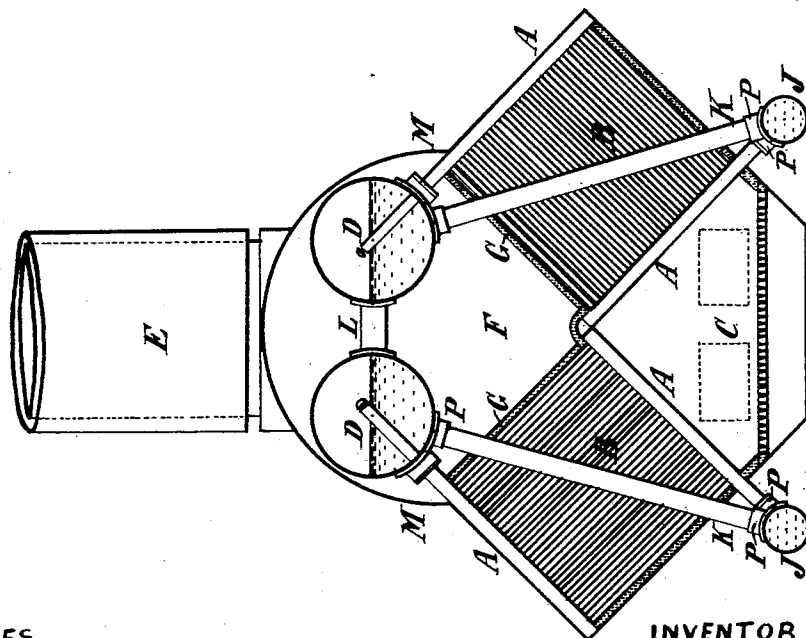


FIG. 3.



WITNESSES

P. W. Wright
S. C. Gunn

INVENTOR

Stephen Alley

BY

Howson and Howson
HIS ATTORNEYS

(No Model.)

3 Sheets—Sheet 3.

S. ALLEY.
STEAM BOILER.

No. 587,667.

Patented Aug. 3, 1897.

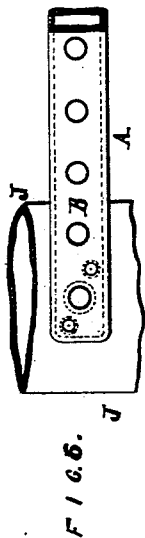


FIG. 7.

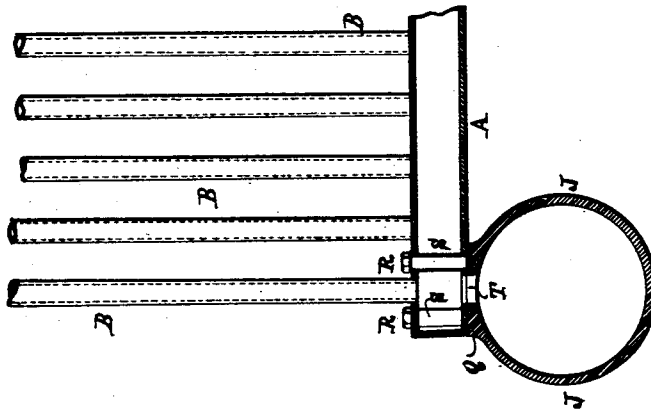
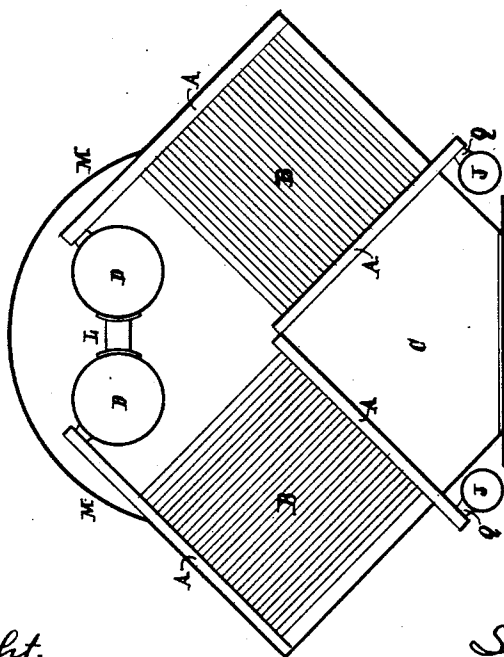


FIG. 5.



WITNESSES

P. W. Wright.

L. C. Connor

INVENTOR

Stephen Alley

BY

Howson and Howson
HIS ATTORNEYS

UNITED STATES PATENT OFFICE.

STEPHEN ALLEY, OF GLASGOW, SCOTLAND.

STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 587,667, dated August 3, 1897.

Application filed June 5, 1897. Serial No. 639,541. (No model.) Patented in England February 13, 1896, No. 3,273.

To all whom it may concern:

Be it known that I, STEPHEN ALLEY, a subject of the Queen of Great Britain and Ireland, and a resident of Glasgow, Scotland, have invented certain Improvements in and Connected with Steam-Boilers, (for which I have obtained British Patent No. 3,273, dated February 13, 1896,) of which the following is a description.

My said invention comprises an improved construction of steam-boiler suitable for high or other pressures, and which, while securing efficiency, has compactness with accessibility of all parts and other advantages.

Two modifications of boilers as made according to my invention are shown on three accompanying sheets of explanatory drawings, Figures 1 and 2, on Sheet 1 thereof, being, respectively, a front and a side elevation of one modification, and Figs. 3 and 4, on Sheet 2, being, respectively, a transverse vertical section and a longitudinal vertical section of the same. Fig. 5, on Sheet 3, is a transverse vertical section of a second modification; and Figs. 6 and 7 are views, at right angles to each other, of details of the same.

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

The modification of my improved boiler shown in Figs. 1, 2, 3, and 4 of the drawings comprises a number of sections of a vertical flat form, each section consisting of a rectangular arrangement having two header or end pipes A, connected by numerous tubes B, and being placed with one diagonal vertical. Two sets of the sections are combined in the boiler with their horizontal diagonals in the same horizontal plane, and present angular spaces F and C above and below, in the latter of which the furnace C is placed. The tubes B in each set or wing are placed parallel to the outer lower side and the inner upper side of the rectangle, or they might be placed at right angles to those sides. In all cases, however, all the tubes B of a set of sections are parallel to each other, while the tubes of one section are placed opposite the spaces between the tubes of the adjacent sections. The fire-gases from the furnace C pass from the inner end in two streams from back to front through and among

the tubes B of the two sets of sections, and from the front enter the space F in the upper angle between the two sets of sections, where they act on two (or it might be one or more than two) steam-drums D on their way to the uptake E. The gases are compelled to take the course described by brick or other partitions G, suitably arranged. More than two of the sets of sections may be arranged in a horizontal row, with furnaces in the lower angular spaces between the sets.

The tubes B are fixed to the header or connecting pipes A, which are preferably of approximately square section, by being expanded in holes in the pipes, external holes being formed to admit the expanding-tool, and being closed by screw-plugs, which are made recessed or hollow, when in positions in which they are exposed to strong heat. The upper header or connecting pipes A are separately connected to the steam-drums D, and the lower header or connecting pipes are separately connected to bottom water-drums J, so that each section of tubes can be detached while leaving the other sections untouched. The downward flow of the water is provided for by external pipes K, connecting the steam-drums D with the bottom water-drums J. The steam-drums D are connected by short pipes L, which also act as distance-pieces. A metal casing M incloses the parts, and it is provided with doors N for each set of sections for the purposes of examining or cleaning the tubes.

The modification of my improved boiler shown in Figs. 5, 6, and 7 comprises an improved mode of fixing the header-pipes A to the steam-drums D and water-drums J. In this case stools or joint connections P, shown as being interposed between the header-pipes A and drums D and J in Figs. 1, 2, 3, and 4, are dispensed with and the header-pipes are fixed directly to the drums. Facings Q are formed on the drums, and the header-pipes A, which are square in section, are fixed to them by stud-bolts R, which pass through distance tubes or pieces S within the header-pipes for strengthening purposes. The header-pipes A are blind at both ends, communication with the drums D and J being effected through lateral openings T. The other parts of this

modification are constructed and arranged similarly to the corresponding parts of the modification previously described.

What I claim is—

- 5 A steam-boiler comprising two or more sets of rectangular sections or elements, each set of sections being constructed with water-tubes all parallel to each other, and arranged, each with one diagonal vertical, and the sets
10 of sections presenting between them upper and lower angular spaces, respectively for the

fire-gases and furnace or furnaces, and being connected to upper and lower drums, substantially as and for the purposes herein set forth.

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

STEPHEN ALLEY.

Witnesses:

WILLIAM HASTIE,
GEORGE PATTERSON.