

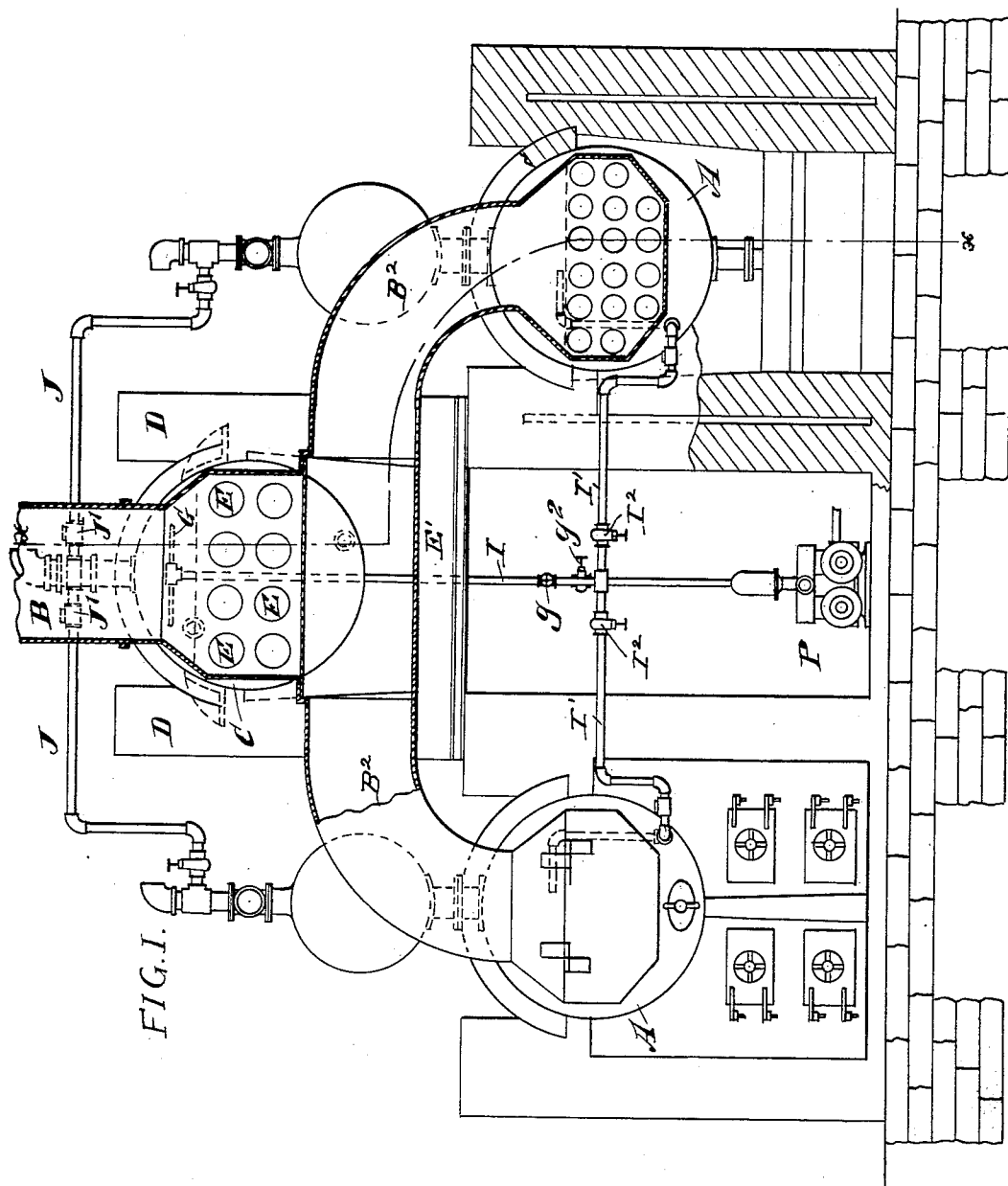
(No Model.)

2 Sheets—Sheet 1.

J. B. FLEMING.
STEAM BOILER.

No. 586,431.

Patented July 13, 1897.



WITNESSES:
Donn Twitchell
H. L. Reynolds.

INVENTOR
J. B. Fleming
BY *Wm. H. Reynolds*
ATTORNEYS.

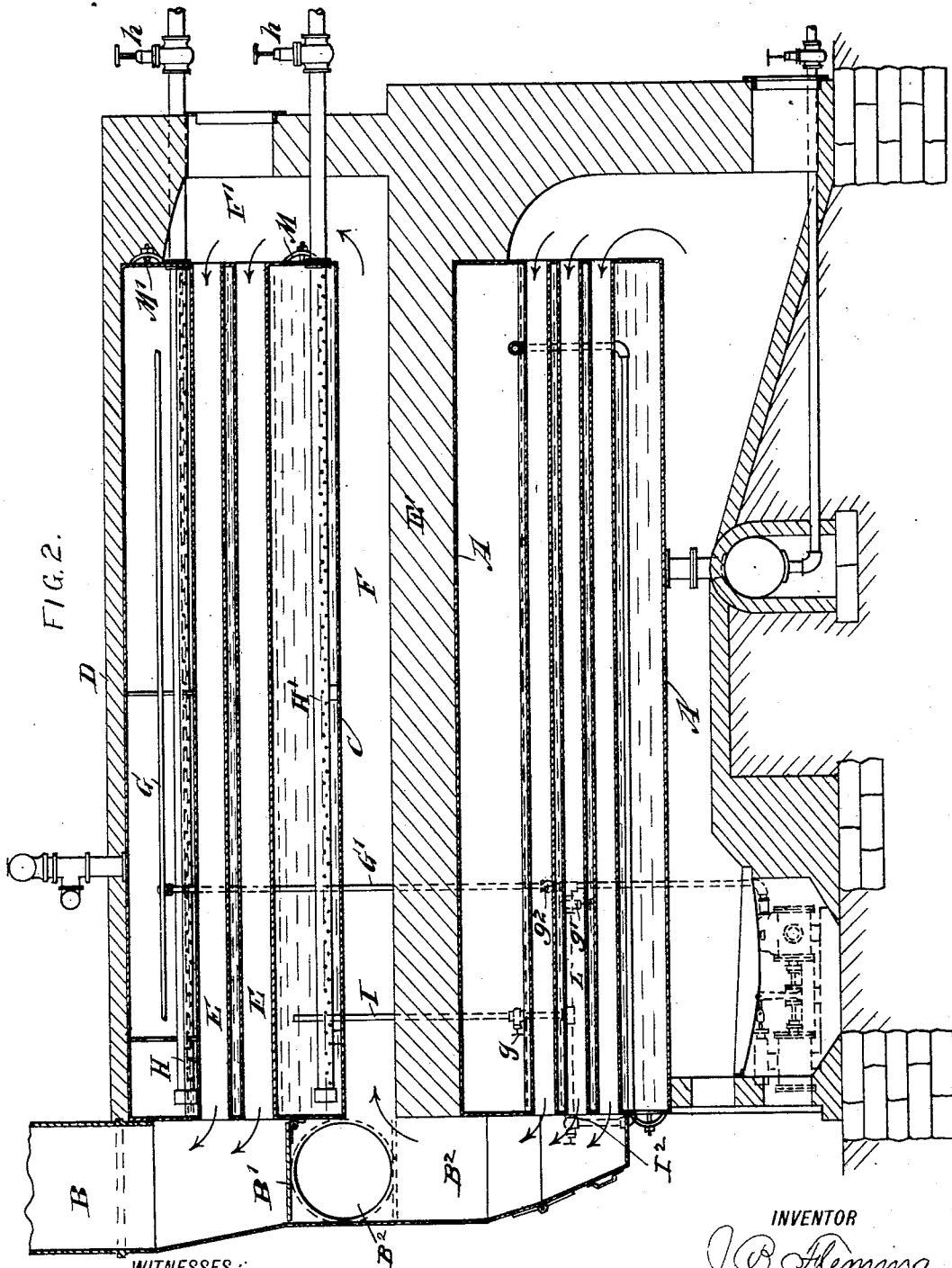
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UNITED STATES PATENT OFFICE.

JOHN B. FLEMING, OF FRISCO, UTAH.

STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 586,431, dated July 13, 1897.

Application filed August 28, 1896. Serial No. 604,201. (No model.)

To all whom it may concern:

Be it known that I, JOHN B. FLEMING, of Frisco, in the county of Beaver and State of Utah, have invented a new and Improved Steam-Boiler, of which the following is a full, clear, and exact description.

The invention relates to a steam-boiler of that class in which the feed-water is introduced into a receptacle heated by the products of combustion in the fire-box of the boiler and in which the feed-water thus primarily treated is conducted to the boiler proper.

The invention consists in such features of construction and combinations as will be fully described hereinafter and defined in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in both the figures.

Figure 1 is a sectional elevation of my invention, and Fig. 2 is a longitudinal section thereof on the line X X of Fig. 1.

The form of my invention illustrated in the drawings has two boiler-shells A, horizontally mounted in suitable masonry and having fire-boxes below them. The shells A are of the fire-tube type and communicate at their front end with branches B² of a stack B, the stack arising vertically from the juncture of the branches B². In a masonry superstructure D is held a horizontal purifier-shell E. A wall E' is arranged below the shell E to form the bottom of a flue F. The flue F communicates at the front end with the stack branches B² at their juncture and at its rear end with a chamber F', leading to the fire-tubes of the shell E. The fire-tubes of the shell E conduct the gases from the furnace forward into the stack B. Within the stack B and between the front ends of the flue F and the fire-tubes of the shell E is located a valve B'. When this valve B' is closed, the gases from the furnace pass rearward through the flue F and thence forward through the shell E and up the stack B. When the valve B' is open, the gases pass directly up through the valve B' and do not pass through the shell E and flue F.

A pump P is located between the boilers A and is in connection with a vertically-extend-

ing pipe G', leading into the shell E and terminating near the crown-sheets thereof. The pipe G' is in connection with perforated pipes G, running longitudinally through the upper portion of the shell E. By means of the pump P the feed-water is forced upward through the pipe G' and into the shell E through the pipes G. A pipe I runs from the lower portion of the shell E downward between the boilers A and communicates at its lower end with two horizontal and oppositely-running branches I', respectively running into the boilers A. Each branch I' is commanded by a valve I². A pipe L (see the dotted lines in Fig. 2) leads from the pipe G' to the pipe I.

A valve g commands the pipe I. A valve g² commands the pipe G' at a point above the pipe L, and a valve g' commands the pipe L between the pipes I and G'. When the shell E is in operation, the valves g and g² are open and the valve g' is closed. The feed-water then passes up the pipe G' through the shell E and out through the pipe I into the boilers A. When the shell E is not in use, the valves g and g² are closed and the valve g' is open, whereupon the water is passed from the pump P through the pipes G' L and branches I' into the boilers A. It will thus be seen that while the invention is principally adapted for use with the shell E should it from any unusual cause be desired to dispense with the operation of the shell E the same may be cut out, as explained.

Within the shell E are located two blow-out pipes H and H'. The pipe H' is located at the bottom of the shell E and is perforated at points within the shell. A valve h commands the end of the pipe which is projected beyond the shell. This pipe serves to carry off impurities which settle as sediment in the bottom of the shell E. The blow-out pipe H is located in the upper portion of the shell and, like the pipe H', is perforated within the shell E and commanded by a valve h without the shell. The pipe H serves to carry off impurities floating in the form of scum on the surface of the water.

It is advisable to equalize the pressure within the boilers A and the shell E. To attain this end, I connect these parts by means of pipes J. (To be seen in Fig. 1.) The pipes

J are respectively commanded by valves J'. The steam thus led from the boilers A to the shell E assists in the heating of the feed-water. Under these conditions the water is led

5 by gravity from the shell E to the boilers A.

When the parts of the apparatus are adjusted as shown in the drawings, the gases from the furnace pass first through the fire-tubes of the respective boilers, thence upward
10 through the branches B² of the stack B, through the flue F, chamber F', and forwardly into the stack B through the tubes of the shell E. The pump P being in operation forces the feed-water into the upper portion of the
15 shell in the form of a spray against the heated surface of the shell. This heats the water and causes the separation of the impurities, as is understood from prior devices of this class. The water thus heated and purified
20 passes out of the shell E by means of the pipe I and thence into the boilers A. If it be unnecessary to heat and purify the feed-water, the valves of the pipes G', L, and I should be manipulated as explained, whereby to cut out
25 of operation the shell E.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. A steam-boiler having two horizontal
30 boiler-shells, a furnace beneath each shell, a stack branching to communicate with each boiler, a feed-water heating and purifying shell located above the boiler-shells and intermediately of the same, fire-tubes within
35 the purifying and heating shell, a wall beneath said shell to form a flue communicating with the stack and leading to the rear ends of the fire-tubes in the heating and purifying shell, a valve within the stack at a point
40 between the flue and the discharge ends of the fire-tubes in the heating and purifying shell, and a pipe leading from the heating and purifying shell to the boiler-shells, substantially as described.

2. A steam-boiler having two horizontal
45 boiler-shells, a furnace with each shell, fire-tubes within each boiler-shell, a stack at the front of the boiler, a branch leading oppositely from each side of the stack and respectively communicating with the front ends of
50 the fire-tubes within the boiler-shells, a wall located above the boiler-shells and intermediately thereof, a feed-water heating and purifying shell located above the wall and forming
55 a flue beneath the heating and purifying shell, a valve within the stack at a point above the front end of the flue whereby to direct the products of combustion rearward through the flue, fire-tubes within the heating
60 and purifying shell and leading the products of combustion forward into the stack above the valve therein, and means establishing communication between the interiors of the three shells, substantially as described.

3. A steam-boiler having two horizontal
65 boiler-shells, a feed-water heating and purifying shell located above the boiler-shells, a pipe leading to the heating and purifying shell, a second pipe leading from the heating and purifying shell and having branches re-
70 spectively running to the boiler-shells, a valve located within the second pipe at a point above the branches, a third pipe running between and communicating with the two first-named pipes, a valve within the first-named
75 pipe at a point above the third pipe, and a valve commanding the third pipe at a point between the two remaining pipes, substantially as described.

4. In a steam-boiler having two horizontal
80 boiler-shells, a stack branch in connection with each of the boiler-shells, a stack arising from the juncture of the branches, a feed-water heating and purifying shell mounted above the boiler-shells and intermediately
85 thereof, the heating and purifying shell having a series of fire-tubes running into the stack and capable of having a draft from the horizontal boilers pass through them, a feed-pump located below the horizontal boilers and
90 intermediately thereof, a pipe passing upward from the feed-pump and into the heating and purifying shell, two perforated pipes running longitudinally through the heating and purifying shell and in connection with the vertical pipe, a perforated blow-out pipe within
95 the heating and purifying shell and running longitudinally through it, and a valve located within the stack and below the discharge ends of the fire-tubes within the heating and purifying shell whereby the valve may change
100 the direction in which the draft passes from the boiler-shells, substantially as described.

5. A steam-boiler having a boiler-shell, a wall running above the boiler-shell, a heating
105 and purifying shell located above the wall and forming a flue between the heating and purifying shell and the wall, a stack running from the boiler-shell upward past the heating and purifying shell, the stack communicating
110 with the gas-passages of the boiler-shell and of the heating and purifying shell, and the stack also communicating with the said flue, the rear end of the flue being in communication with the gas-passages of the heating and
115 purifying shell, and a valve located within the stack and between the flue and the heating and purifying shell whereby the stack may be opened and closed and the draft caused to pass through the flue into the rear
120 end of the heating and purifying shell and thence outward into the stack or to pass directly through the stack, substantially as described.

JOHN B. FLEMING.

Witnesses:

J. W. DUNN,

A. K. FARNSWORTH.