

(No Model.)

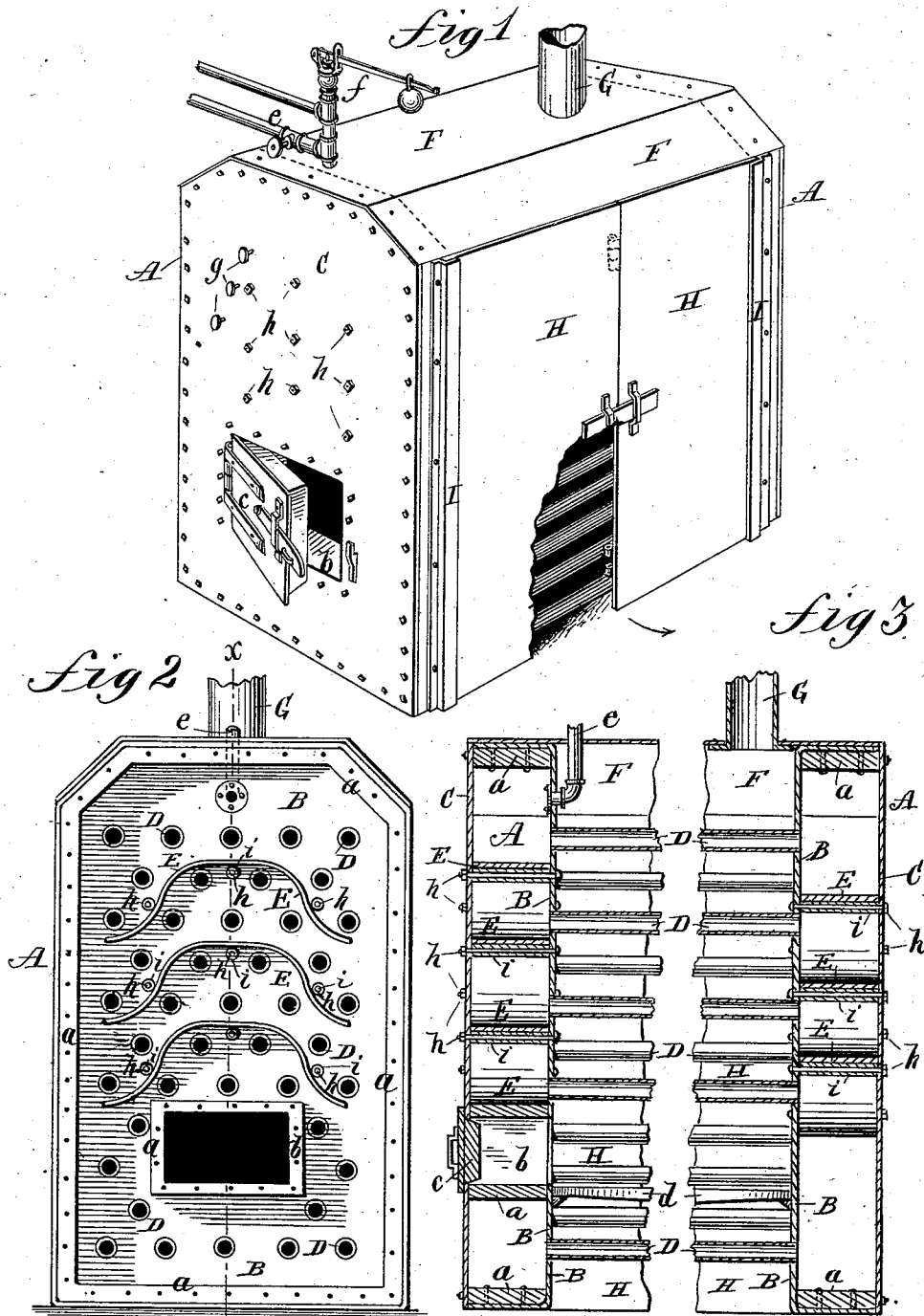
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STEAM BOILER.

No. 289,610.

Patented Dec. 4, 1883.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

ALBERT P. BLATCHLEY, OF DEPOSIT, NEW YORK; ALBERT C. BLATCHLEY,  
ADMINISTRATOR OF SAID ALBERT P. BLATCHLEY, DECEASED, ASSIGNOR  
TO ALBERT B. BLATCHLEY, OF SAME PLACE.

## STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 289,610, dated December 4, 1883.

Application filed December 27, 1882. (No model.)

*To all whom it may concern:*

Be it known that I, ALBERT P. BLATCHLEY, of Deposit, in the county of Broome and State of New York, have invented certain new and useful Improvements in Steam-Boilers, of which the following is a full, clear, and exact description.

My invention relates to steam-boilers of the "sectional" type, in which a water and steam chamber at each end are connected by longitudinally-arranged water and steam pipes or tubes, suitable casings being provided to form a combustion-chamber around the tubes, about which tubes the products of combustion circulate.

The invention consists in a special construction of the deflecting-plates for effective water-circulation, and in the means of securing the same in the end chambers of the boiler.

The invention includes, also, a construction of the side casings of the boiler to admit of convenient access to the water-tubes for removal of sooty accumulations therefrom, and the end water and steam chambers are connected at the bottom only by the water-tubes, to avoid excessive expansion and contraction of the parts of the boiler, the object being to provide a boiler that may be cheaply built, that will steam quickly, and may be readily cleaned and repaired, all as hereinafter fully described.

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

Figure 1 is a perspective view of my improved boiler, partly broken away. Fig. 2 is a front view of the boiler with the outer plate of the water-chamber removed, and Fig. 3 is a broken longitudinal sectional elevation of the same on line *x x*, Fig. 2.

A A are the end water and steam chambers, constructed, as here shown, of a suitable metallic frame, *a*, over which the inner plates, B, of the chambers are flanged, and to which frame said plates B are bolted or riveted. The outside plates, C, of the chambers are also bolted to the frame in such manner as to

be removable, to expose the ends of the water-circulating tubes D, which are arranged longitudinally of the boiler, and are firmly expanded into the inner plates, B, to establish free water and steam circulation between the end chambers, A, through the tubes. Suitable firing-aperture, *b*, fire-door *c*, and grate *d* are provided, the grate preferably extending the whole length of the combustion-chamber between the plates B B. Any suitable steam-outlet, as at *e*, safety-valve connections *f*, and test-cocks *g* may be provided with suitable blow-off and feed cocks at or near the base of either chamber A. The number and arrangement of the tubes D may vary with the uses and capacity of the boiler; but I prefer to arrange them in vertically-staggered position, as in Fig. 2, for the better introduction of the preferred form of water-deflecting plates E, Figs. 2 and 3, which are placed within the end chambers, A, between the plates B C, and to avoid piercing the latter plates, to secure the deflectors E in place, I intertwine the deflectors with or around the stay-bolts *h*, or their inclosing spacing-tubes *i*, the stay-bolts being located to hold the deflectors clear of the ends of the tubes D. I prefer to make the deflectors E in arched or double-ogee form, and of a length shorter than the width of the end chambers, A, so that the hotter waters and vapors may rise freely in the central arch of the deflectors, and the cooler currents flow down their ends at the sides of the chambers toward the fire-grate. The special purpose of the deflectors, however, is to secure and maintain a quick, constant circulation of the water through the tubes D from end to end of the boiler, and for this purpose they are located in the front and rear chambers, A, in alternately higher horizontal planes, as in Fig. 3, and thus direct the rising heated currents and vapors by a circuitous course to the water-level and steam-space of the boiler. These deflectors may be approximately straight plates, and may be otherwise secured in the end water-chambers; but the curved or arched form and method of fastening above described is preferred. As shown, a series of water-

tubes, D, extend across the boiler below the fire-grate; but these lower tubes may be omitted, if desired.

It will be noticed that the end chambers, A A, are not connected at the bottom other than by the tubes D, whereby the joints of the tubes with the plates B of the chambers A are unaffected by the unequal expansion and contraction of any such bottom ties or plates.

The combustion-chamber about the tubes D is formed by side casing and by the head-casing F, suitably secured to the chambers A, and having a smoke-flue, G. Each side casing of the combustion-chamber I make in two or more doors, H, here shown hinge-jointed vertically, to be opened by drawing the joints outward and releasing the sides of the doors from suitably-rabbeted stops or continuous angle-plates, I, secured to the sides of the end chambers, A, which construction secures convenient access to the parts for cleaning and repair of the tubes and end plates of the boiler. The doors H will be secured by suitable slide-bolts or other fastenings, and may also, with the other exterior parts of the boiler, be covered with any approved non-conductor of heat. These doors, H, may be hinged horizontally, and the angle-plates correspondingly located at the top and base of the boiler; but the arrangement shown is preferred.

I do not limit myself to the precise construction herein shown and described—as, for instance, the frame *a* may be substituted by angle-irons, to flanges of which the outside plates, C, may be bolted, and one outside plate, C, may alone be removable, as the opposite outside plate may be fixed, and may have suitable hand-holes for removal of scale deposits dislodged from the tubes at that end of the boiler. The top of the boiler may also be of curved or arched form, as will be readily understood.

It is believed that this boiler has features which commend it for its quick-steaming properties, economy in working, accessibility for cleaning and repairs, and non-liability to disastrous explosion.

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

1. In a steam-boiler, the combination, with the end chambers and the tubes connecting the same together, of the arched deflectors arranged in said chambers, those in one chamber alternating with those in the other chamber, and adapted to form clearance-passages between their ends and the sides of the chambers, substantially as and for the purpose set forth.

2. In a steam-boiler, the combination, with the end chambers and the tubes connecting the same together, of the arched deflectors arranged in said chambers, those in one chamber alternating with those in the other chamber, and adapted to provide clearance-passages between their ends and the sides of the chambers, and the water-tubes arranged below the fire-grate and communicating with the end chambers, substantially as and for the purpose set forth.

3. The combination, with the end chambers, A A, and tubes D, of water-deflectors E, fitted in the chambers, with a clearance-space at their ends for downflow of the cooler currents at the sides of the chambers, substantially as shown and described.

4. The combination, with end chambers, A A, and tubes D, of deflectors E, of arched form, and fitted in the chambers, with clearance-spaces at their ends, substantially as shown and described.

5. The method of securing the deflectors in the end chambers, A A, of the boiler clear of the ends of the tubes D, which consists in intertwinning the deflectors about the stay-bolts of the chambers, substantially as shown and described.

6. The combination, with the ends A A and top casing, F, of the boiler, of side casings, H H, hinge-jointed between flanges or angle-plates I I, whereby ready access is given to the interior of the boiler, substantially as shown and described.

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Witnesses:

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WM. B. LEWIS.