

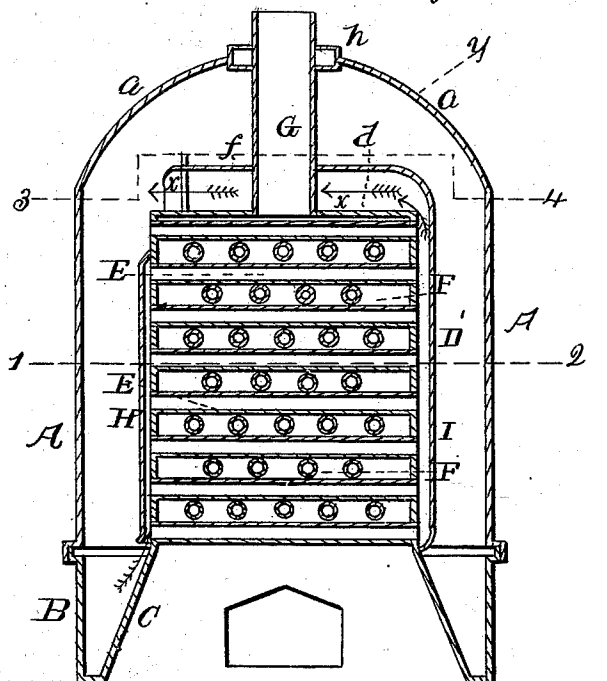
*L. B. Flanders,*

*Steam-Boiler Water-Tube.*

*N<sup>o</sup> 43,301.*

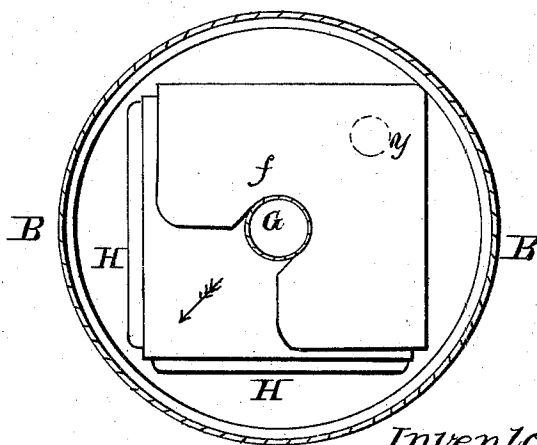
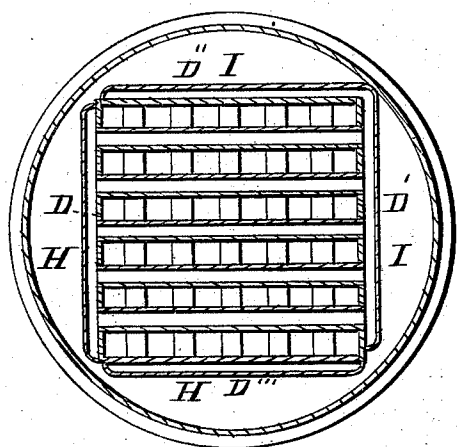
*Patented June 28, 1864.*

*Fig. 1.*



*Fig. 2.*

*Fig. 3.*



*Witnesses.*  
*Charles E. Foster.*  
*W. Albert Hall.*

*Inventor.*  
*L. B. Flanders.*  
*Henry Howson*  
*Atty.*

# UNITED STATES PATENT OFFICE.

L. B. FLANDERS, OF PHILADELPHIA, PENNSYLVANIA.

## IMPROVEMENT IN STEAM-BOILERS.

Specification forming part of Letters Patent No. 43,301, dated June 28, 1864.

### *To all whom it may concern:*

Be it known that I, L. B. FLANDERS, of Philadelphia, Pennsylvania, have invented certain Improvements in Steam-Boilers; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

My invention consists, first, of certain deflectors arranged in respect to the inner tubular casing of a steam-boiler, substantially as described hereinafter, for the purpose of insuring a free circulation of water through the tubes; secondly, of a plate peculiarly arranged within the boiler, so as to preserve the steam which escapes from the same in a comparatively dry state.

In order to enable others skilled in the art to make and use my invention, I will now proceed to describe its construction and operation.

On reference to the accompanying drawings, which form a part of this specification, Figure 1 is a vertical section of a steam-boiler with my improvement; Fig. 2, a sectional plan on the line 1 2, Fig. 1; and Fig. 3, a sectional plan on the lines 3 4, Fig. 1.

Similar letters refer to similar parts throughout the several views.

A is the outer casing of the boiler, the top *a* of which, in the present instance, is of the dome shape represented in the drawings, the lower end of this casing being secured to the base B, within which is a casing, C, inclosing the fire-chamber and forming the base or continuation of the inner casing of the boiler, which is of the square form represented in the drawing, and is composed of the four sides D, D', D'', and D'''. A series of layers of tubes, E, pass through the sides D and D' of the inner casing, and another series of layers of tubes, F, are arranged at right angles to the former, and pass through the sides D'' and D''' of the said inner casing, from the top D of which a central pipe, G, passes through a suitable packing-box, *h*, in the dome-shaped top *a* of the outer casing.

The horizontal or nearly horizontal tubes of steam-boilers, especially those most exposed to the direct action of the fire, are apt to be rapidly deteriorated, owing to the globules of steam escaping in both directions and forcing the water from the said tubes. In order to obviate this, I use on two sides of the square inner casing of the boiler the deflect-

ors H, between which and the casing the water passes upward (as shown by the arrows, Fig. 1) into the tubes, to take the place of the steam generated in the latter, which steam can only escape from the tubes at the sides opposite to the deflectors H. Such a free circulation of water is thus maintained through the tubes as must effectually protect them against the injurious action of the fire. In order that the certainty of this free circulation of the water through the tubes may be increased, I secure to those sides of the inner casing opposite the deflectors H additional deflectors, I, to the space between which and the casing, the water cannot gain access from below, the said space being devoted to the direction of the globules of steam which pass from the tubes to the upper portion of the boiler.

The two deflectors I I, as seen in Fig. 2, are formed of one piece of metal, and are continued upward above the top *d* of the casing in one sheet, *f*, parallel with the said top. By means of this sheet *f* the steam, after passing from the tubes to the top of the casing *d*, is deflected in the direction of the arrows *x* to one side of the boiler, while the pipe through which the steam passes from the boiler is arranged at the opposite side of the same, as shown by dotted lines *y*. The steam taken from the boiler at this point must necessarily be in a comparatively quiescent state, and free from the moisture caused by the agitation and foaming which takes place at the opposite side of the boiler.

It will be evident that the inner casing of the boiler may be six or eight sided without departing from the main features of the invention.

I claim as my invention and desire to secure by Letters Patent—

1. The deflectors I, arranged in respect to the inner tubular casing of the boiler, substantially as and for the purpose set forth.

2. The plate *f*, arranged in respect to the deflectors I, the tubular casing, and exit-opening *y*, as and for the purposes described.

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

L. B. FLANDERS.

Witnesses:

JOHN WHITE,  
CHARLES HOWSON.