H. Leslie,

Steam-Boiler Water-Tube.

No. 43,417. Patented July 5, 1864.

Fig: 1.

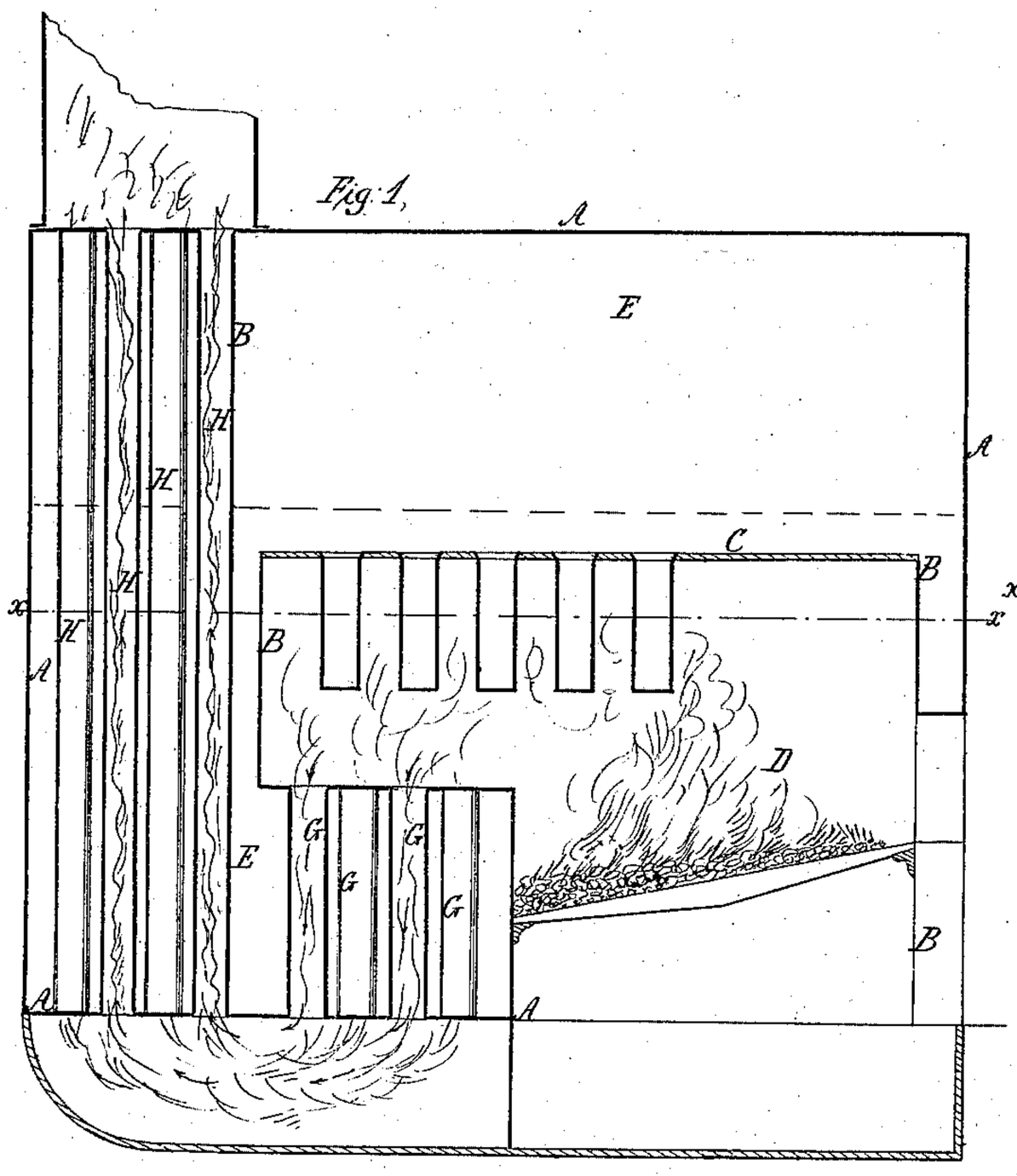


Fig: 3.

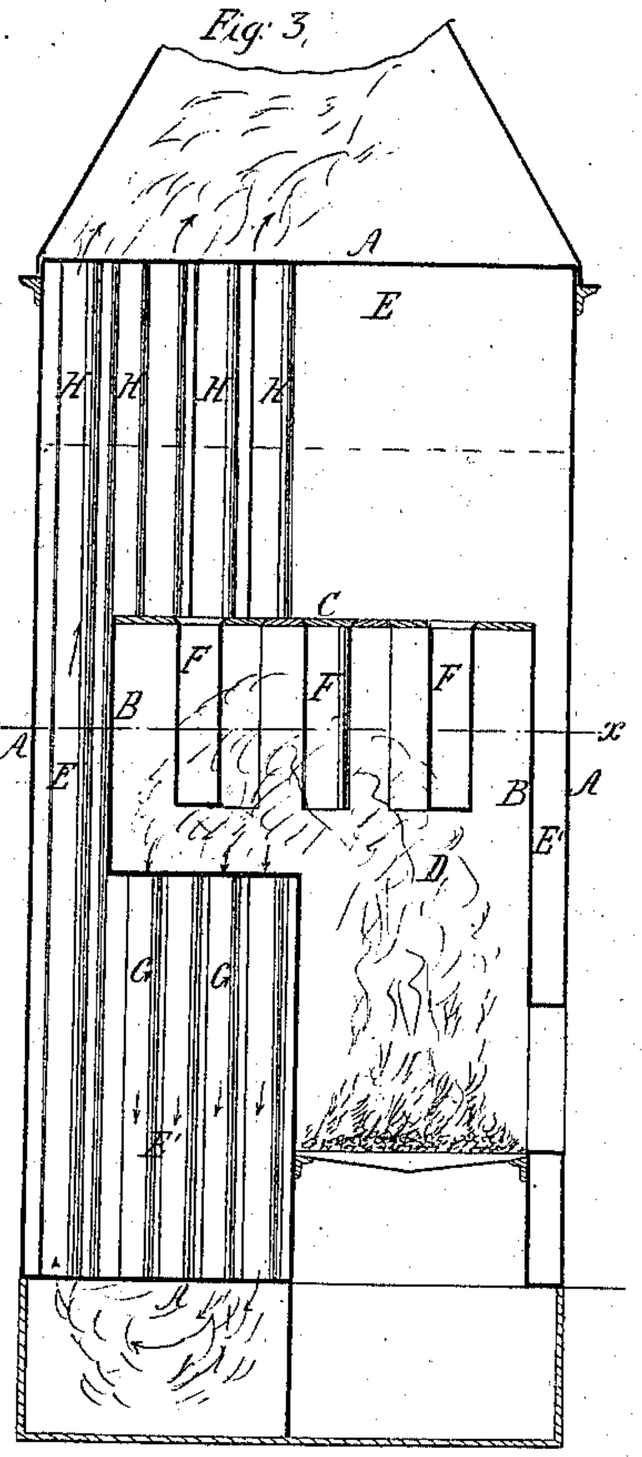


Fig: 2.

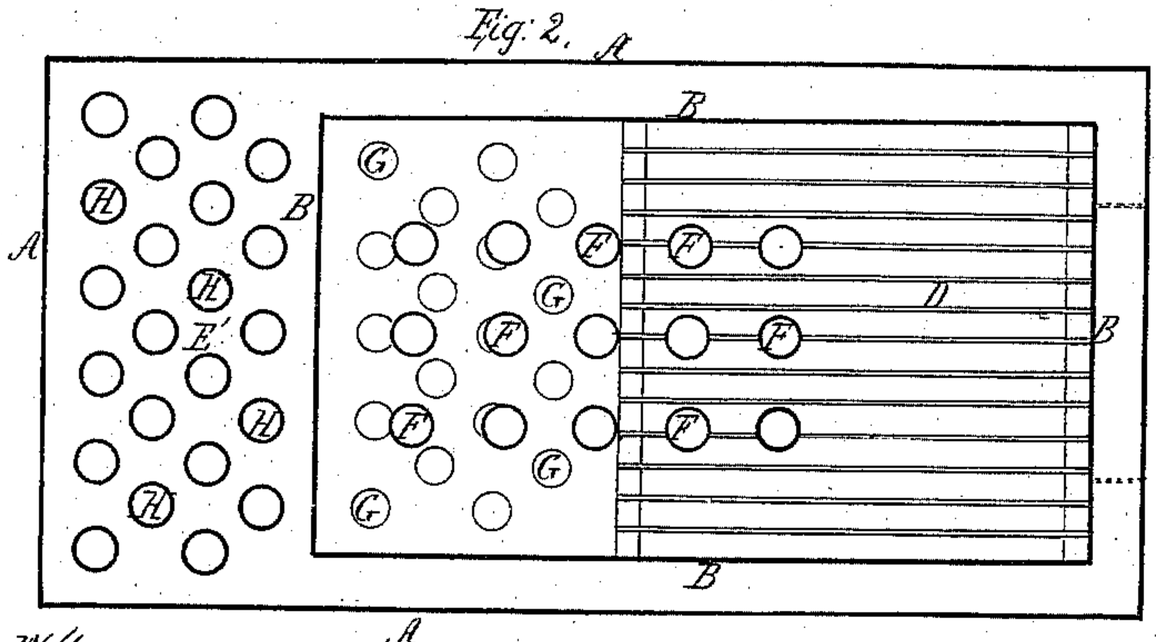
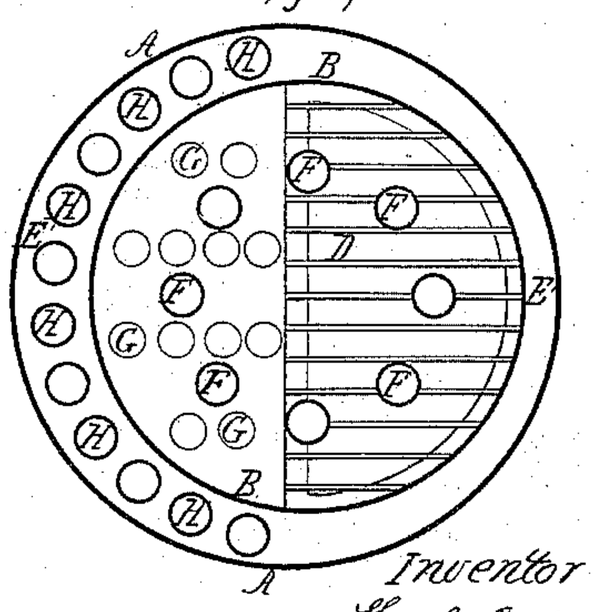


Fig: 4.



Witnesses:
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UNITED STATES PATENT OFFICE.

HUGH LESLIE, OF JERSEY CITY, NEW JERSEY.

IMPROVEMENT IN STEAM-BOILERS.

Specification forming part of Letters Patent No. **43,417**, dated July 5, 1864.

To all whom it may concern:

Be it known that I, HUGH LESLIE, of Jersey City, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Steam-Boilers; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to fully understand and use the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a side sectional elevation of a marine boiler; Fig. 2, a plan or horizontal section of the same; Fig. 3, a side elevation of a stationary boiler; Fig. 4, a plan or horizontal section of the same.

My improvement is applicable to the construction of marine and land or stationary boilers, and the exterior form of my boiler is intended to be the same as those in general use.

The ash-pan to be used under the boiler and the smoke-stack or chimney over the boiler are made and applied in the usual manner.

The method of constructing, riveting, and combining the various parts to be hereinafter described is also the same, except as otherwise specified, as that commonly practiced in boiler-making and no especial description thereof is here required. The same remark applies to the staying or strengthening of the boiler by interior braces, which may be applied wherever the maker deems necessary.

A is the outer shell of the boiler; B, the inner shell; C, the crown-sheet; D, the fire-chamber; E, the steam-space; E′, the water-space.

A prominent feature of my improvement consists in the employment of a series of independent tubes, F, suspended from the crown-sheet C, and projecting downward therefrom into the fire-chamber D, substantially in the manner shown. The lower ends of these tubes are closed. The upper ends are made slightly conical or flaring in form and fit into corresponding conical apertures or holes made through the crown-sheet. The tubes thus fitted will be kept tight by the downward pressure of the steam, while they may be at any time easily removed for cleaning or the replacement of defective tubes.

So long as the water covers the crown-sheet the tubes will always be filled, and as the tubes project into the fire-chamber and receive upon them the direct action of the fire they will greatly assist to promote the rapid evaporation of the water.

Between the inner and outer shells, A B, at the back part of the fire-chamber, I arrange a series of smoke flue-tubes, G, and at the back part of the boiler, running entirely through the same from top to bottom, I arrange another set of smoke flue-tubes H, substantially in the manner shown. The bottom of the boiler stands upon a suitable ash-pan, and the tubes H are covered by a suitable smoke-stack or chimney.

The course of the products of combustion is represented by the arrows. After acting upon the tubes F the heated products pass downward through the flues G, along the under side of the boiler, within the ash-pan, to the bottom of the tubes H, through which said products then rise and pass out into the chimney.

The tubes G and H are intended to be constantly surrounded with water and the passage of the heated products of combustion through them assists to promote the evaporation of the water. The upper ends of the tubes H pass through the steam-space and promote the drying of the steam, all in the manner well understood by persons skilled in the art.

In the application or use of the independent tubes F, I do not limit myself to any precise number or size, nor to any particular arrangement or location thereof within the boiler.

In the use of tube F, I believe that an important advantage is gained over ordinary steam-boilers by securing a freedom from the danger of sudden or powerful explosion from the lack of water. Should the water in the boiler from any cause fall below the crown-sheet, the lower ends of the tubes F will soon be burned off by the fire, when the steam

from the boiler will escape from the tubes F, extinguish the fire, and prevent further damage to the boiler.

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

1. In combination with the fire-chamber D, the flues G, to conduct the products of combustion downward, all substantially as herein shown and described.

2. The combination, with the said short-flue tubes G of the flue-tubes H, extending through the boiler, substantially in the manner and for the purpose herein shown and described.

HUGH LESLIE.

Witnesses:
JAMES P. HALL,
GEO. W. REED.