P. F. SEMONIN.
Steam-Boiler.

No. 205,979. Patented July 16, 1878.

Fig. 1.

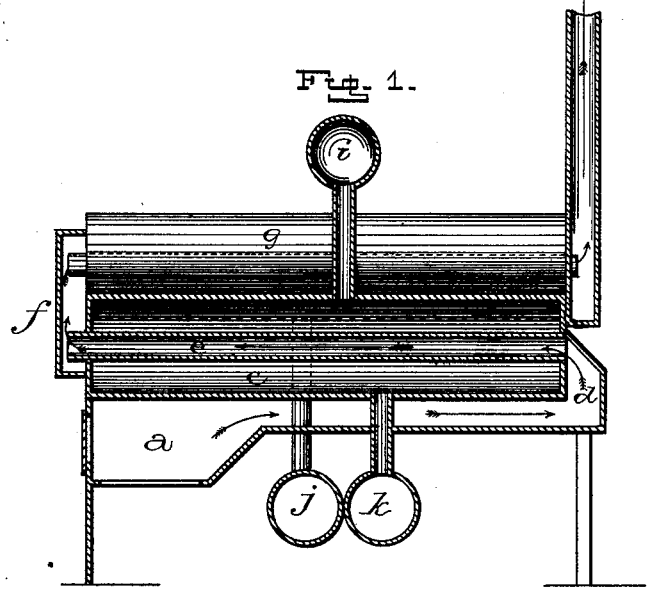
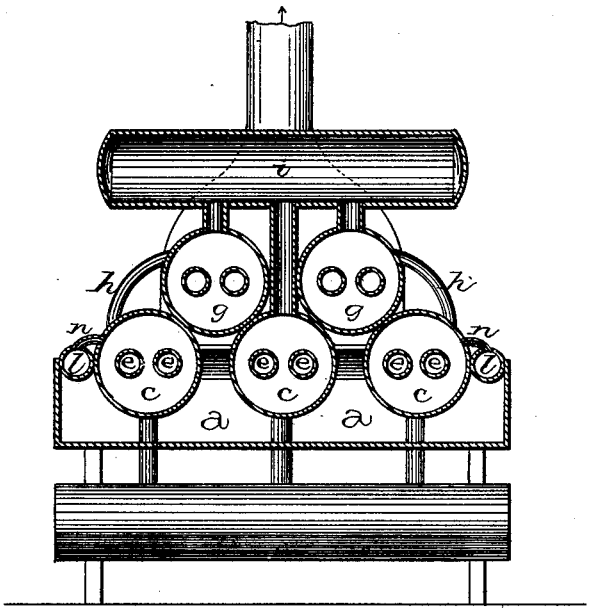


Fig. 2.



Witnesses.

J. W. Garner
R. M. Barr

Inventor.

P. F. Semonin,
per
F. A. Lehmann,
atty.

UNITED STATES PATENT OFFICE.

PAUL F. SEMONIN, OF LOUISVILLE, KENTUCKY.

IMPROVEMENT IN STEAM-BOILERS.

Specification forming part of Letters Patent No. **205,979**, dated July 16, 1878; application filed May 25, 1878.

To all whom it may concern:

Be it known that I, PAUL F. SEMONIN, of Louisville, in the county of Jefferson and State of Kentucky, have invented certain new and useful Improvements in Steam-Boilers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to an improvement in steam-boilers for stationary land and marine purposes; and it consists in the arrangement of parts whereby economy in space and fuel is obtained, as will be more fully described hereinafter.

The accompanying drawings represent my invention, in which—

Figure 1 is a longitudinal vertical section, and Fig. 2 is a vertical cross-section of the same.

a represents the furnace, over the top of which is placed a battery of Cornish boilers, *c*, which may be in any desired number and of any suitable size and capacity. The products of combustion first heat the under side of both batteries, then pass up through smoke-box *d*, through the flues *e* in the lower series of boilers, *c*, thence through the return-flues *f*, backward through the second battery of boilers, *g*, and then up the uptake or chimney.

The second battery of boilers may be of the same size as the first ones, but one less in number, and each one will be placed in the hollow between two lower ones, so that any heat which escapes up through between the lower boilers will strike against the bottom of those on top.

The upper and lower batteries are connected together by steam-pipes *h*, and all of them are connected, either directly or indirectly, with the steam-drum *i*. Beneath the grate are located the supply-drums *j k*, which are connected, respectively, to each battery.

In order to utilize the greatest possible amount of heat, small side heaters *l* are used to cover over the tops of the side of the furnace, instead of using brick or tile, and these side heaters are connected to the lower battery by steam-pipes *n*.

As the boilers are now arranged, in general use, after the products of combustion have traversed the under side of the boilers and then passed through the return-flues, the surplus heat then escapes up the chimney; but by the arrangement above described this heat is made to heat the upper battery, thus increasing the heating-surface to that extent, and saving the use of that much fuel. Not only does this arrangement economize fuel, but, by placing the boilers one above the other, a great saving is effected in space, which is a great item, especially in steamboats and ships.

This arrangement leaves the same room for man-holes, hand-holes, blow-off valves, and mud-drums as in the present system, and the same room for supply purposes from the supply-engines or other supplying apparatus.

Having thus described my invention, I claim—

The combination of two batteries of boilers, one series upon the top of the other, and so constructed and arranged that the products of combustion first heat the under sides of both batteries, then pass through the flues of the under series, and thence return through the upper series to the uptake, substantially as shown.

In testimony that I claim the foregoing I have hereunto set my hand this 21st day of May, 1878.

P. F. SEMONIN.

Witnesses:
S. J. JONES,
F. MAGUIRE.