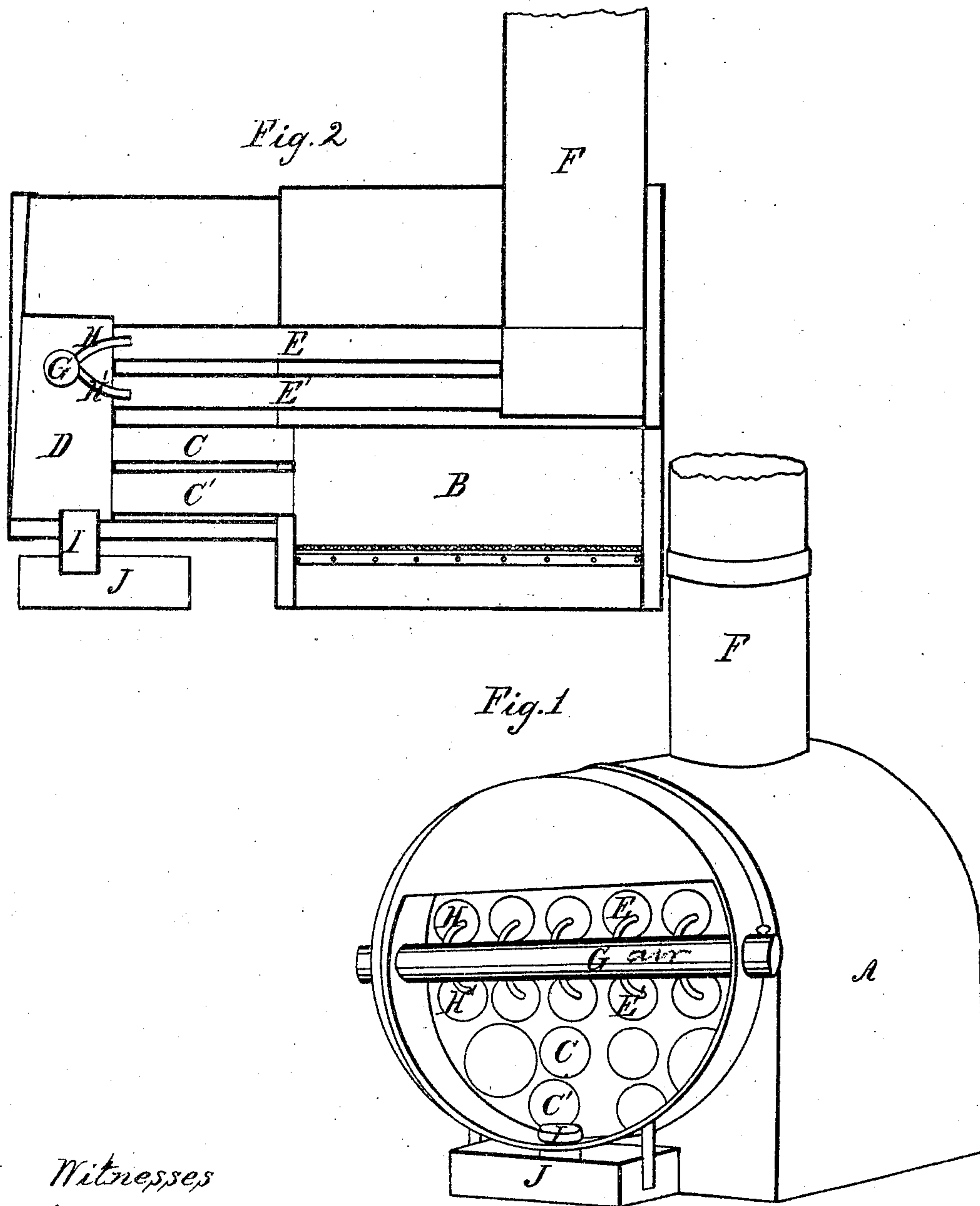


No. 86,425.

PATENTED FEB. 2, 1869.

R. LIGHTHALL.
STEAM GENERATOR.



Witnesses
Francis S. Long
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REUBEN LIGHTHALL, OF BROOKLYN, NEW YORK.

Letters Patent No. 86,425, dated February 2, 1869.

IMPROVEMENT IN STEAM-GENERATORS.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, REUBEN LIGHTHALL, of Brooklyn, in the county of Kings, and State of New York, have invented certain new and useful Improvements in Steam-Boilers; and I do hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, in which—

Figure 1 is a perspective view of a boiler with my improvement attached, and

Figure 2, a vertical cut section of the same.

The purpose and intent of my invention are to utilize and make effective the gases that enter the return-tubes or flues of a boiler that is constructed with such return-tubes or flues, by inflaming the gases that enter said tubes or flues, by a proper admixture of oxygen supplied by a current of atmospheric air.

A is the body of a boiler of ordinary form, having the furnace B, in which the fuel is placed to be burned, and the lower sections of flues C from the same, ending at the commencement of the back connection D.

E E' are the upper section of flues that run from the back connection D to the uptake of the boiler.

F is the steam-chimney of the boiler, made in the ordinary form.

G is a horizontal pipe lying midway between the upper tier of flues, which may be supplied with a proper current of air by either natural or artificial means, the supply to the same being regulated by a damper or by any other desired means.

H H are pipes that lead from the air-pipe G to the centre of each of the return-flues, there being as many of these pipes as there are flues in the return of the boiler, the purpose of these pipes being to supply oxygen to the gases that pass through these flues, to inflame the said gases, to utilize and economize the heat that would otherwise be wasted.

I is a pipe attached to the bottom of the back connection, through which the carbonic-acid gas may escape to the reservoir J, the said reservoir being kept filled with water, to condense and dispose of the said gas.

By this arrangement I claim that a large saving in fuel can be made, as it is a well-known fact that in the ordinary boiler of the same form, these gases are consumed at the top of the smoke-stack, being unutilized in their passage through the boiler. This effect is shown in innumerable instances by the destruction of the top of the smoke-stack, where these gases are ignited, and where the gases in their passage through the boiler produce no beneficial effect, the effect only being shown at the top of the smoke-stack.

I am aware that many devices for the inflammation of the escape gases have been devised and experimented upon, but in most all cases they have been used in the boiler-furnace to inflame the gases in their passage through the lower section of flues. This system I hold to be a wrong one, as the immediate effect of the fire from that part of the boiler is amply sufficient for its purpose, and in case the gases are there inflamed, the effect of the same on the upper tier of flues is nearly or entirely lost.

The same idea has been advanced for the inflammation of the gases at the back connection of the boiler, for the purpose of utilizing the heat from the gases, but they only effect at that point the heating of the back connection, without producing much of any effect in the flues or tubes in the return.

None of the devices have hitherto effected the purpose, for the reasons named, as the resultant gases from the furnace-fire require, to produce their best effect, to be inflamed and consumed in the return-tubes or flues, as is set forth in the foregoing description.

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

The construction of the air-pipe G with its branches H H, &c., as set forth.

Also, the outlet I, at the bottom of the back connection, to allow the "heavy gases" to fall to the reservoir J, as herein set forth.

REUBEN LIGHTHALL.

Witnesses:

FRANCIS S. LOW,

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