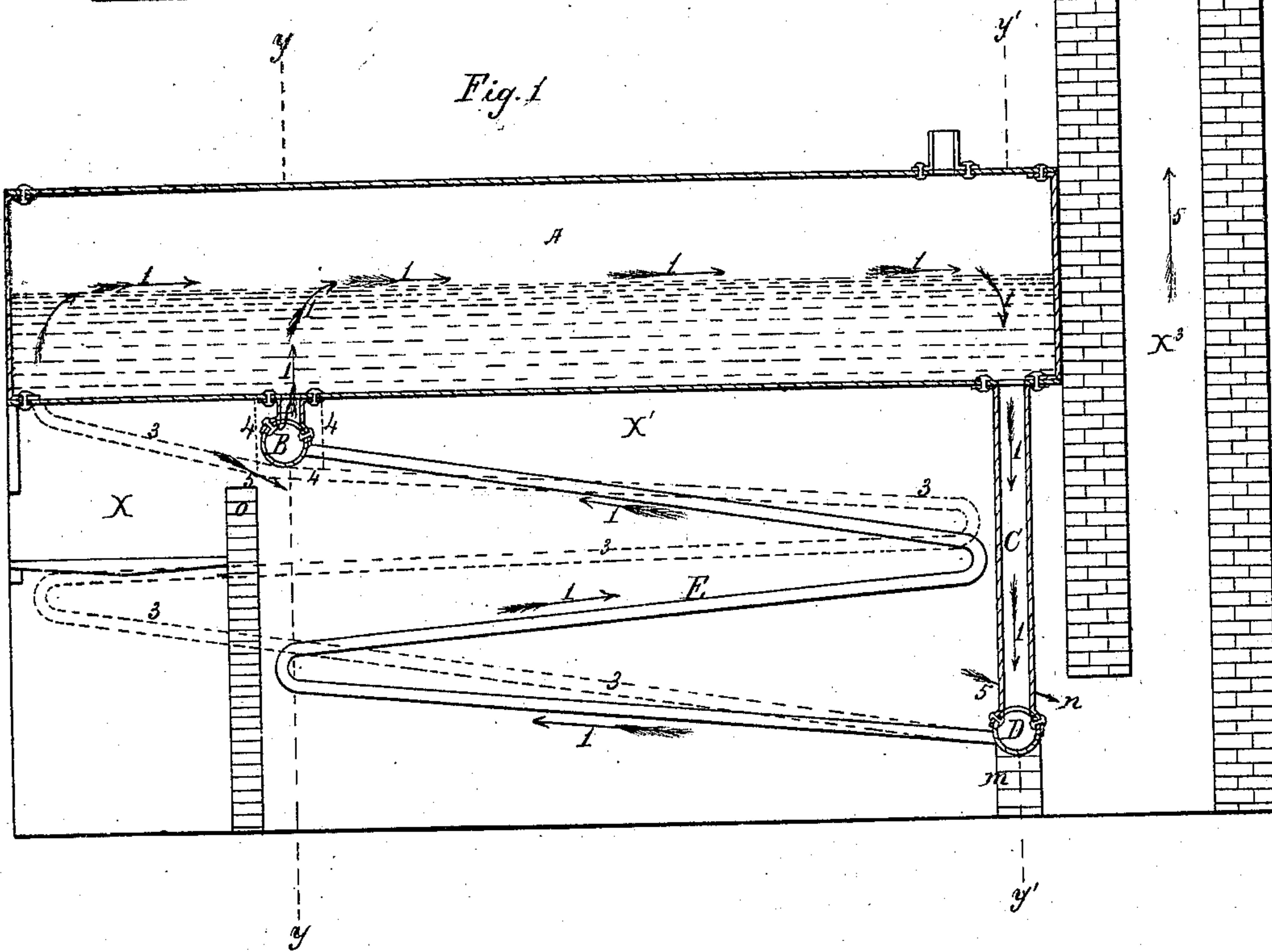
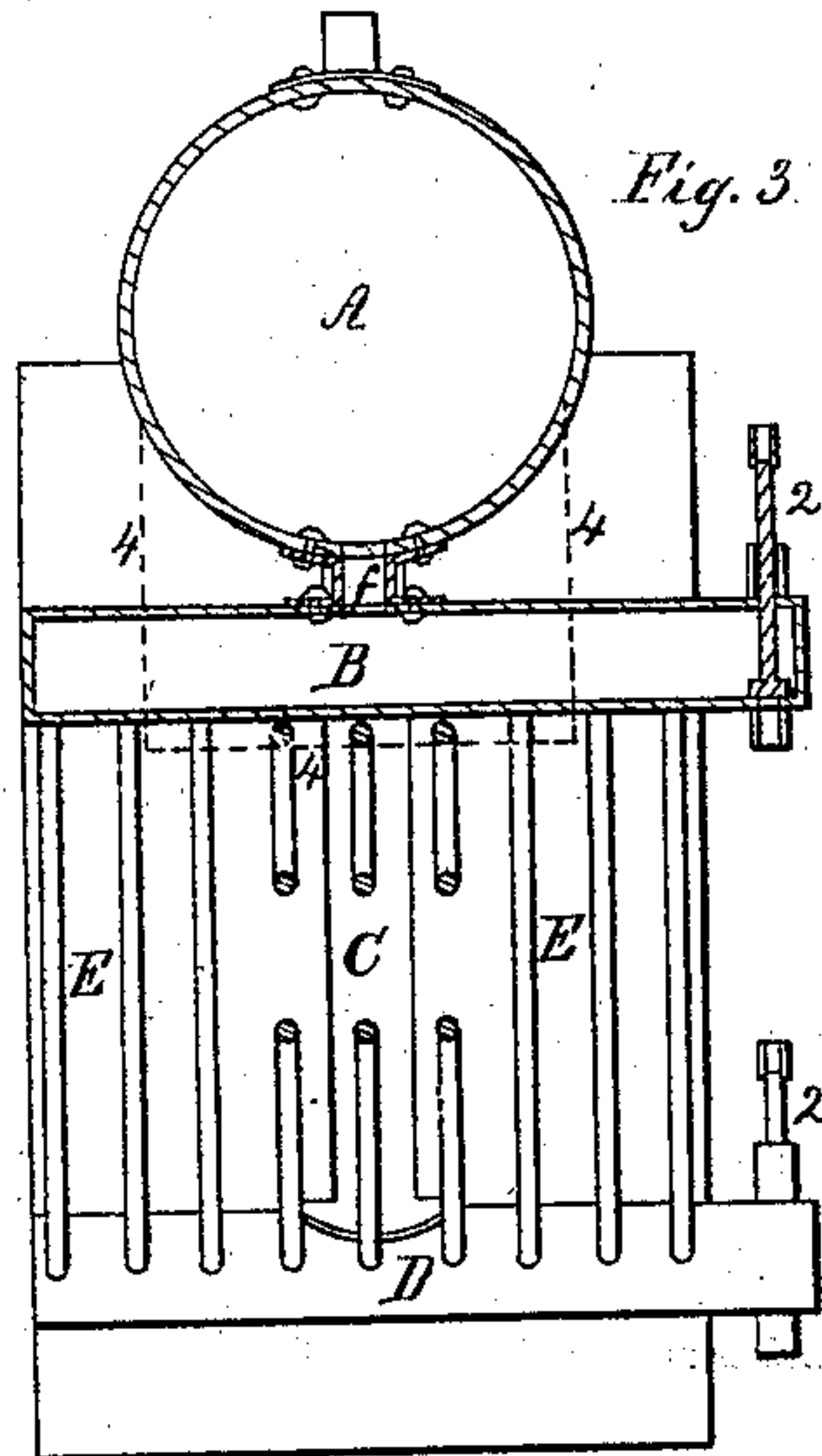
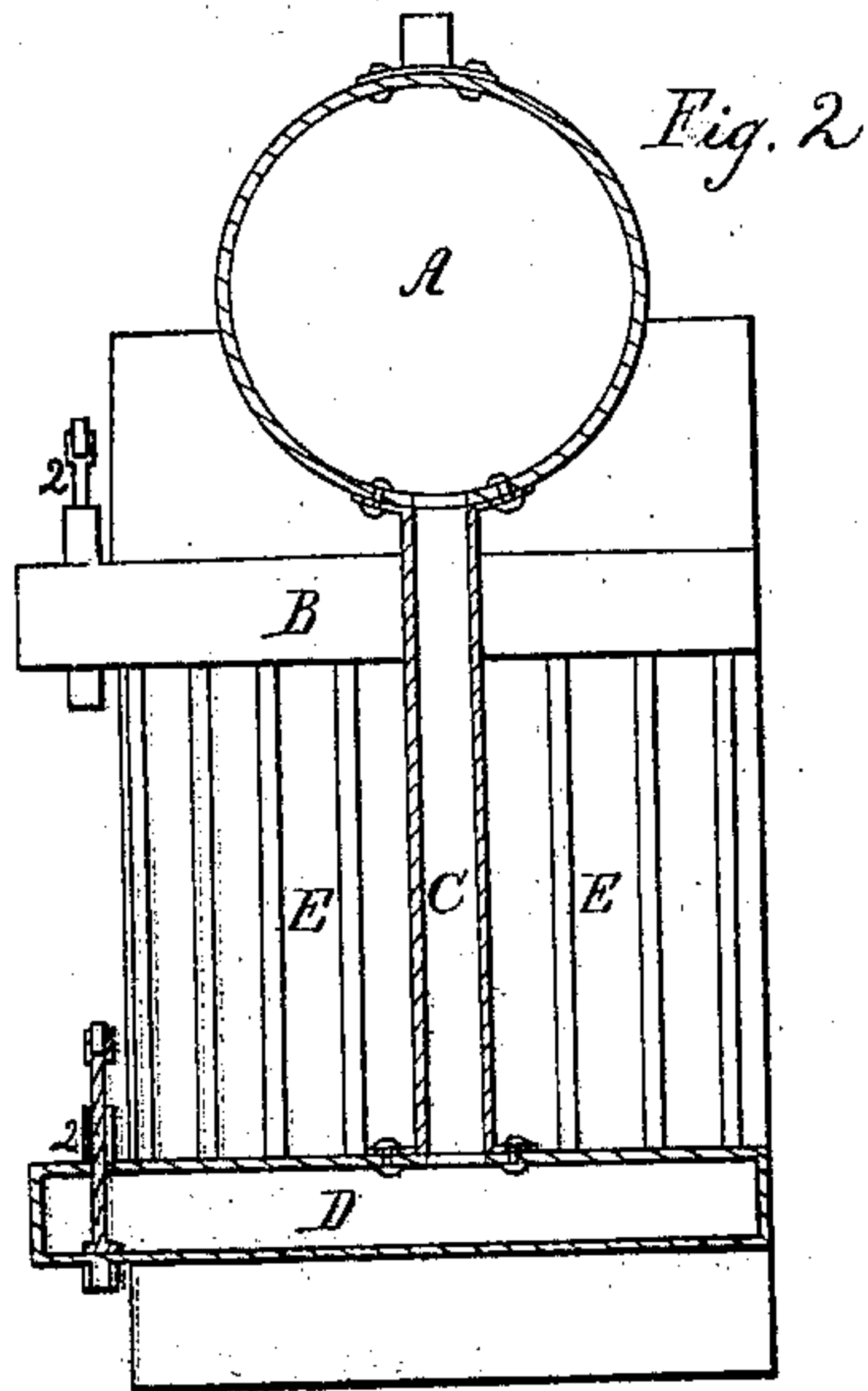


O. P. Shiras
Steam Generator.

N^o 86,464.

Patented Feb. 2, 1869.



Witnesses
A. C. Johnston
Wesley Johnston

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UNITED STATES PATENT OFFICE.

OLIVER PERRY SHIRAS, OF NEWCASTLE, PENNSYLVANIA.

IMPROVEMENT IN STEAM-GENERATORS.

Specification forming part of Letters Patent No. 86,464, dated February 2, 1869.

To all whom it may concern:

Be it known that I, OLIVER PERRY SHIRAS, of Newcastle, in the county of Lawrence and State of Pennsylvania, have invented a new and useful Improvement in Steam-Boilers; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

The nature of my invention consists in so constructing a steam-boiler that when generating steam in it the water will move in a circuitous current, and thereby prevent deposits, incrustations, and the accumulation of sand, dirt, or other gross matter in the boiler.

My invention also consists in providing a steam-boiler with a series of pipes, through the medium of which the water is heated in its passage to the boiler, said pipes being so arranged with relation to the boiler and its furnace that they greatly facilitate the ebullition of the water in the boiler and the evolving of steam therefrom.

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

In the accompanying drawings, which form part of my specification, Figure 1 is a longitudinal section of an ordinary steam-boiler provided with my improvement. Fig. 2 is a transverse section of the same when cut through at line y' of Fig. 1. Fig. 3 is a transverse section of the same when cut through at line y of Fig. 1.

In the drawings, A represents a steam-boiler, which may be provided with the gage-cocks, a safety-valve, and the other appendages of such boiler; but in order to cause a circulating current of water in the boiler for the purpose of preventing deposits, incrustation, and the accumulation of sand, dirt, and other gross matter in the boiler, and to facilitate the heating of the water and the evolving of steam therefrom, I place on the under side of the boiler two pipes, f and c , to which are attached two pipes, B and D, which are at right angles to the pipes f and c , and extend across the boiler-furnace.

The pipes f and B are arranged directly back of the bridge-wall o of the furnace.

Near the back end of the boiler is a vertical pipe, C, to which is attached the pipe D, which

rests on the wall m near the opening n of the furnace-stack.

To the pipes B and D are connected pipes E, which traverse back and forward in the heat-chamber x^1 . These pipes may be extended to the front end of the boiler, so as to come directly over the fire in the fire-chamber x of the furnace, and also extend under or between the grate-bars of the furnace, as indicated by the dotted lines marked 3.

The skillful mechanic will readily see that the boiler may be provided with water-chambers, as indicated by the red lines 4, as substitutes for the pipes f , B, C, and D, and such chambers may be connected by means of pipes arranged substantially the same as the pipes marked E in Fig. 1. Therefore I wish it clearly understood that I do not confine myself to the form and arrangement of the parts as herein described and represented, for the form and arrangement of the several parts of my improvement may be varied and the same good results obtained.

The pipes B and D may be provided with valves, as indicated at 2 in Figs. 2 and 3.

The water-pipe for supplying the boiler with water may be attached to the pipe D.

As the skillful mechanic will readily understand the construction and arrangement of the several parts of my improvement from the foregoing description, and by reference to the accompanying drawings, I will therefore proceed to describe its operation, which is as follows: Having things arranged as hereinbefore described, fire is placed in the fire-chamber x of the furnace, and the pipe B, in connection with the wall m and pipe D near the opening n at the bottom of the stack x^3 , will cause the draft of the furnace to have a reverberating action, so that the flame and heat will pass into and out from the heat-chamber x^1 , as indicated by the arrows marked 5, so that the heat will fill the chamber x^1 , and cause it to act efficiently on the pipes f , B, E, C, and D, the greatest heat being on pipes f and B. The heat, acting on the under side of the boiler directly over the fire-chamber x , and on the pipes f and B, will heat the water, which, when heated, expands, and therefore becomes specifically lighter, and as a necessary consequence rises to the surface, and the cold water will descend down through pipe C into pipe D, and

from it will ascend up through pipes E into pipe B, and from it through pipe *f* into the boiler A, and thus the heated water will rise to the surface of the water in the boiler, part with the steam evolved therefrom, and flow back to the back end of the boiler and descend through pipe C, and again, through the medium of pipes D, E, B, and *f*, ascend into the boiler, and thus, through the medium of said pipes and the action of the heat of the furnace, a circulating current of water is obtained in the boiler, whereby deposits in and incrustation of the boiler are prevented, and the evolution of steam greatly facilitated, with great economy of fuel. The sand, dirt, and other gross matter are carried by the forego-

ing-described circulating current down and deposited in the pipe D, from which it can be removed through the medium of a "mud-valve" or other device.

Having thus described the nature, construction, and operation of my improvement, what I claim as of my invention is—

The combination and arrangement of the pipes *f* B and C D and connecting-pipes E with reference to the boiler A, substantially as herein specified and set forth.

OLIVER PERRY SHIRAS.

Witnesses:

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