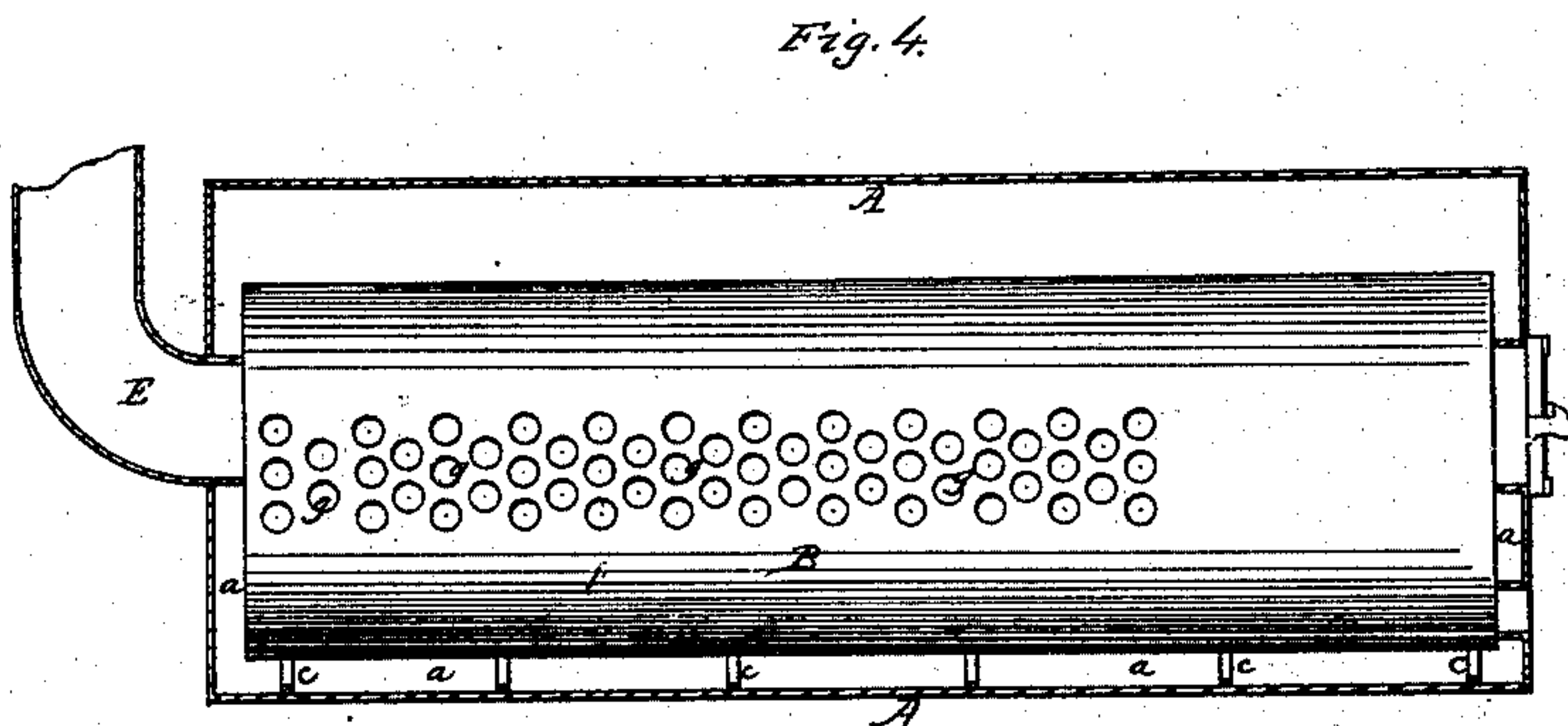
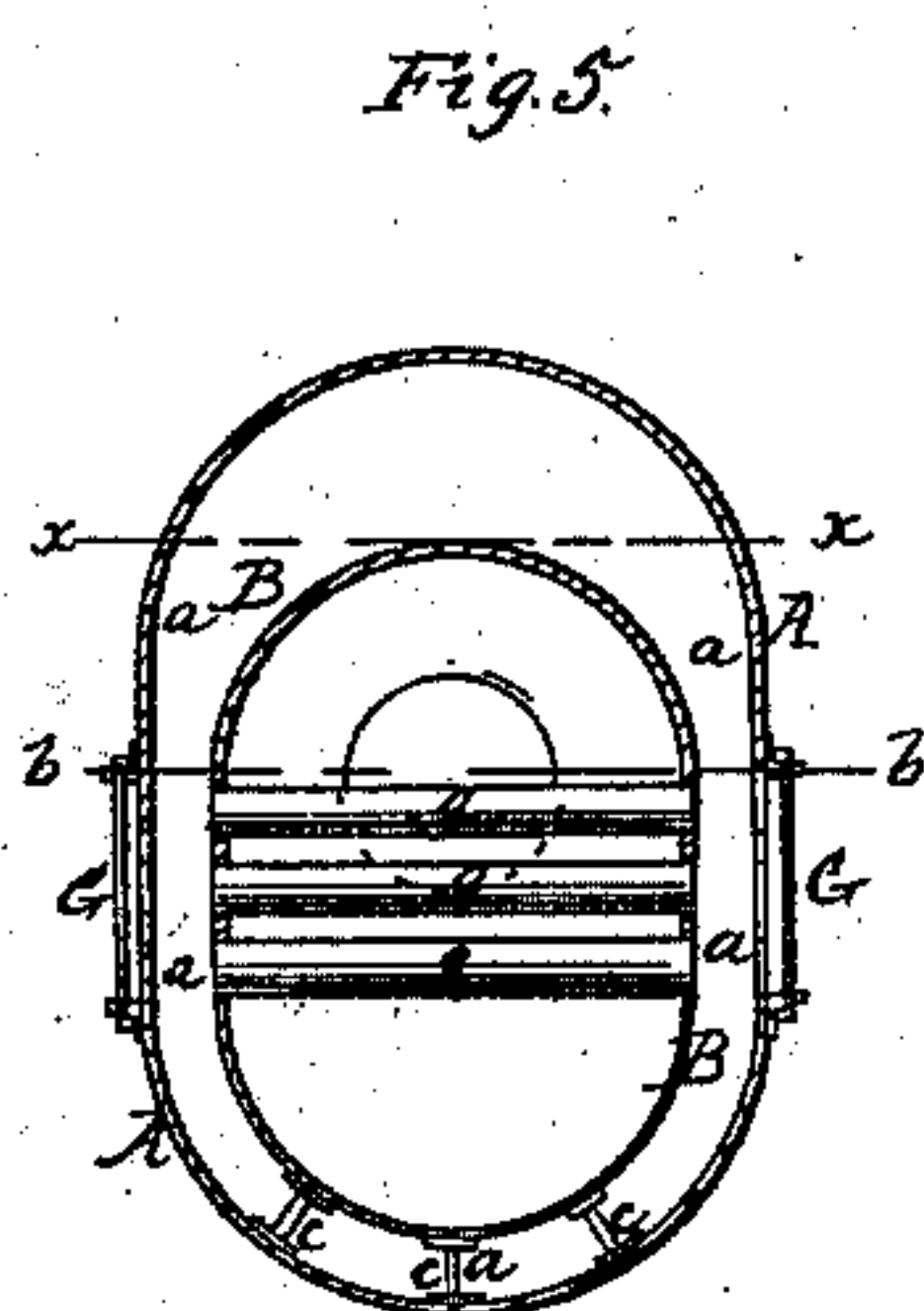
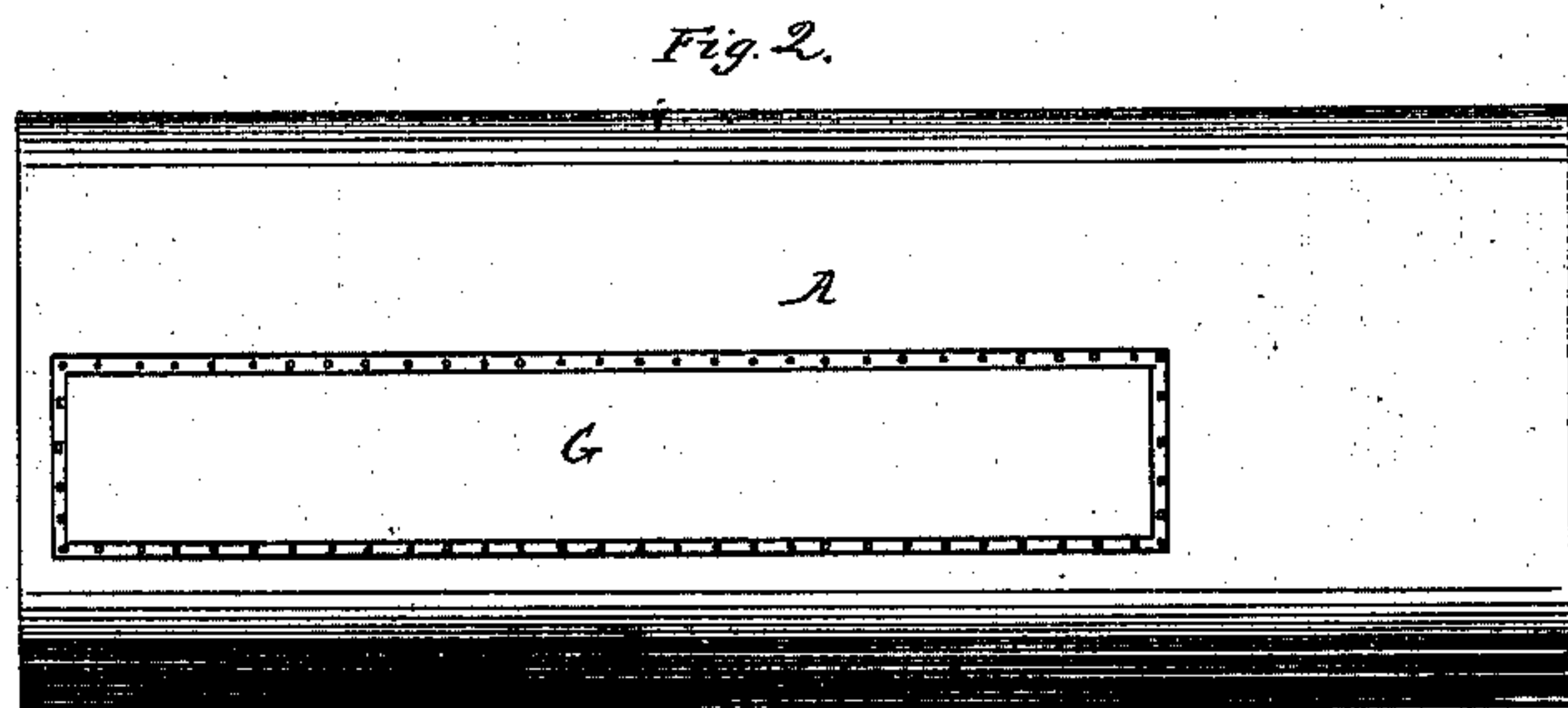
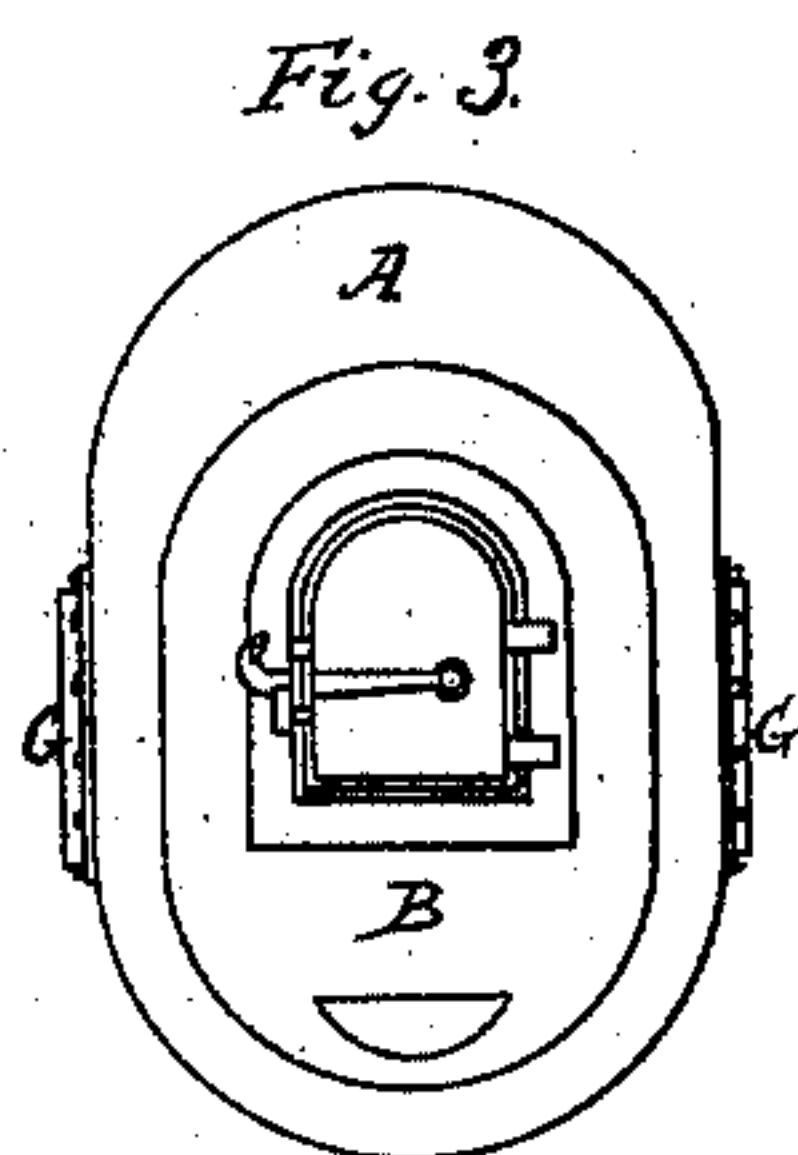
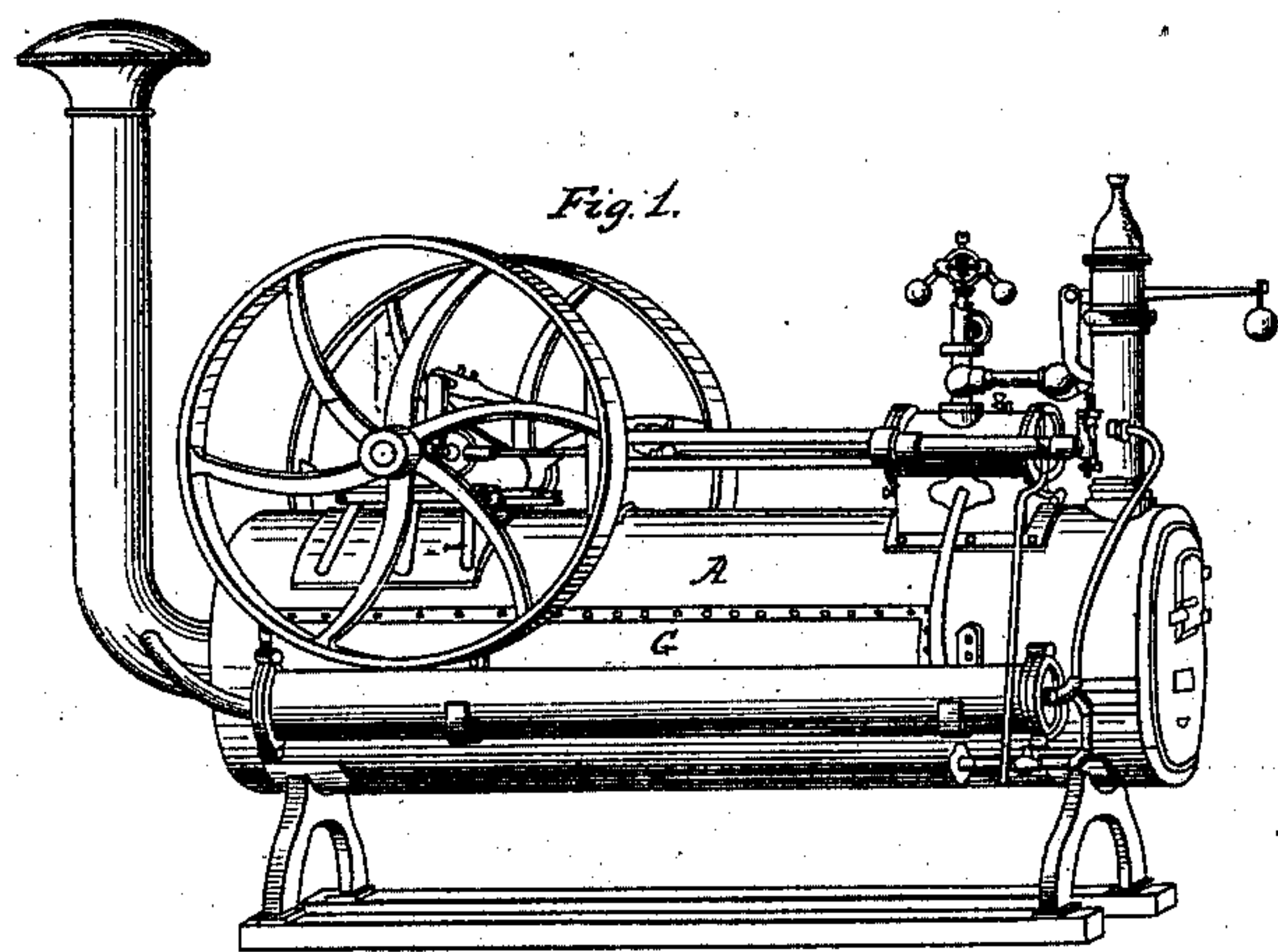


N. Branagan.
Steam-Boiler Fire-Box.

N^o 59,952.

Patented Nov. 27, 1866.



Witnesses:
Edw. L. Hughes
Henry S. Lister

Inventor:
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By
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United States Patent Office.

IMPROVEMENT IN STEAM GENERATORS.

WILLIAM BRANAGAN, OF BURLINGTON, IOWA.

Letters Patent No. 59,952, dated November 27, 1866.

SPECIFICATION.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, WILLIAM BRANAGAN, of Burlington, in the county of Des Moines, and State of Iowa, have invented a new and improved Horizontal Boiler; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings making a part of this specification, in which—

Figure 1 is a perspective view of a horizontal boiler constructed upon my improved plan.

Figure 2 is a side elevation of my boiler.

Figure 3 is a front end view of the same.

Figure 4 is a longitudinal section taken in a vertical plane through the outer shell of the boiler, exposing the inner shell.

Figure 5 is a transverse vertical section.

Similar letters of reference indicate corresponding parts in the several figures.

This invention relates to certain improvements on locomotive and stationary horizontal steam boilers, and has for its object so constructing a boiler of this class, that in a given size of boiler there shall be a greater amount of steam space than is attainable with boilers having cylindrical outer and inner shells; and also, so that there shall be tubes passing transversely, and in a horizontal direction, through the fire chamber and forming communications at each end with the body of water in the boiler for the purpose of affording increased heating surface, as will be hereinafter described.

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

In the accompanying drawings, A represents the outer shell of the boiler, which is of an elliptical shape when taken in cross-section at any point from front to rear. The transverse shape of this shell is shown clearly in fig. 5, wherein it will be seen that the top and bottom portions of the shell are semicircular, and that the sides are flat. The longest axis of the ellipse is in a vertical plane. Within the shell, A, is placed the inner shell, B, which in cross-section is of the same shape as the shell which encloses it. This inner shell, B, constitutes the fire box and flue, and is so arranged and supported that it forms a water space, *a*, of an equal size below the horizontal plane, *b*, that is to say, the distance between the two shells, A B, below the plane *b* is equal. Above this plane, *b*, the space gradually increases and forms the steam space which is above the line, *xx*, indicating the lowest point of water level. This inner shell is supported and secured in position by means of stays or braces, *cc*, which are so constructed as not to form an obstruction to the free circulation of the water in the space *a*. The front end of the inner cylinder is closed by means of a suitable cap or wall, through which openings are made for the introduction of fuel, and also for obtaining access to the ash-pit below the grate. I have not represented a grate in the drawings, as any arrangement adapted to the purpose may be used. I prefer to have the grate extend only as far back as the first line of transverse tubes *gg*, and arranged in a plane below the lowest series of tubes, so that the flame and heated products of combustion shall circulate freely above, below, and between these tubes, on their passage to the smoke-pipe E, at the rear end of the boiler. By reference to figs. 4 and 5, it will be seen that I form transverse communications between the space *a* on each side of the inner shell, B, by means of tubes *gg* above referred to. These tubes are exposed to the most intense heat of the fire, and being arranged within the fire chamber they absorb large quantities of heat which would otherwise be carried off. These tubes, *gg*, not only serve as water conduits through the fire chamber in horizontal planes, but they also serve as braces or struts for strengthening the sides of the inner shell. By having the tubes arranged in horizontal lines, or in planes at right angles to the longest axis of the outer and inner shells, they will be uniformly subjected to the heat, and they can also be cleaned or repaired when necessary, by forming openings through the sides of the outer shell, as shown in fig. 5, through which openings access can be had to the ends of the tubes. The said openings extend along the sides of the boiler as far as the tubes *g* are arranged, and are closed by means of caps, G G, which are secured steam-tight to their shell in any suitable manner which will admit of their removal at pleasure.

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

The construction of a steam boiler of an elliptical outer shell A, and elliptical inner shell B, horizontal transverse communications *g*, and a removable portion or portions G, on the side or sides of the outer shell, all arranged substantially as described and for the purpose set forth.

Witness my hand in the matter of my improved locomotive boiler fire box, this 25th day of July, 1866.

WILLIAM BRANAGAN.

Witnesses:

HENRY H. SCOTT,

HENRY J. JARVIS.