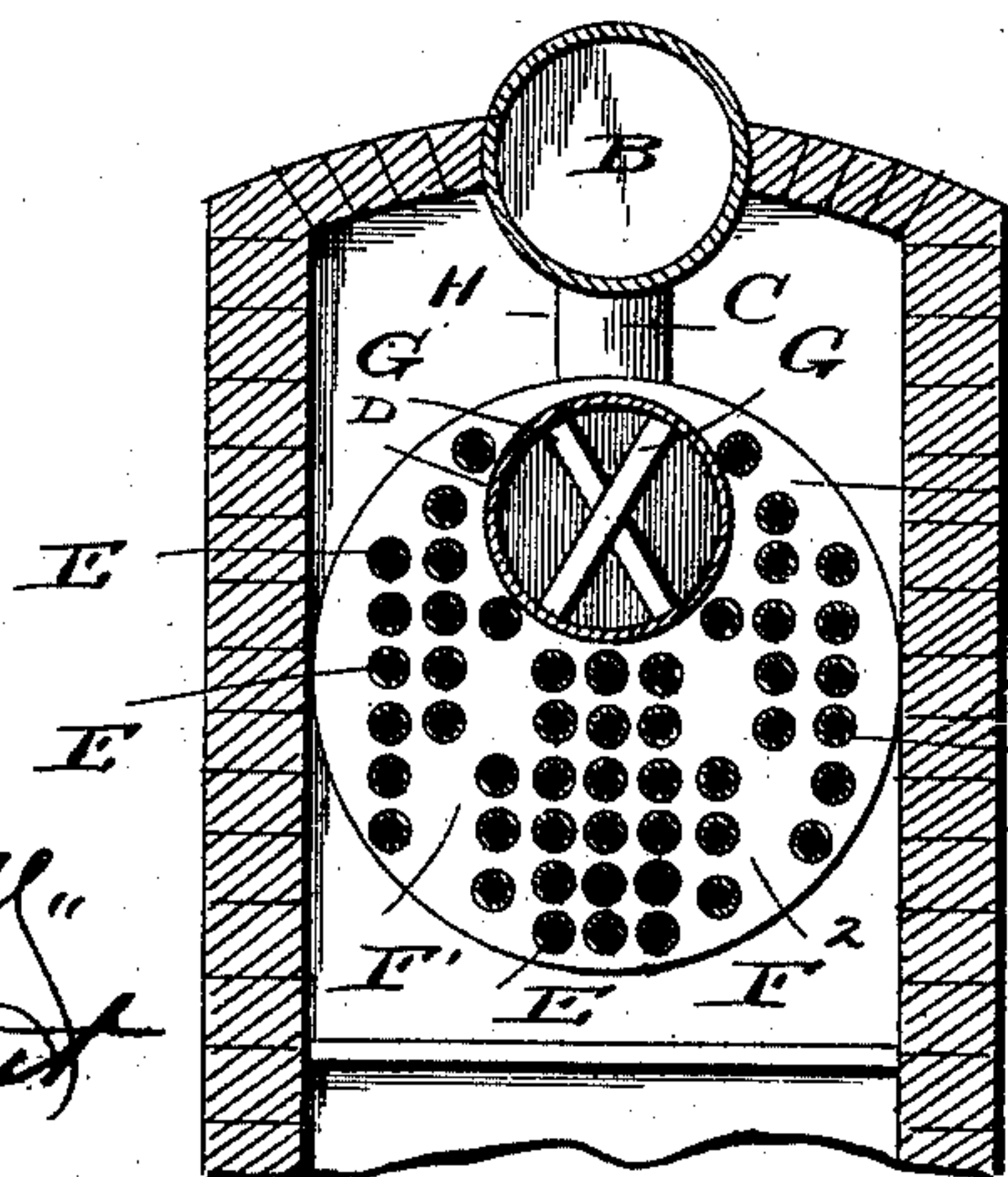
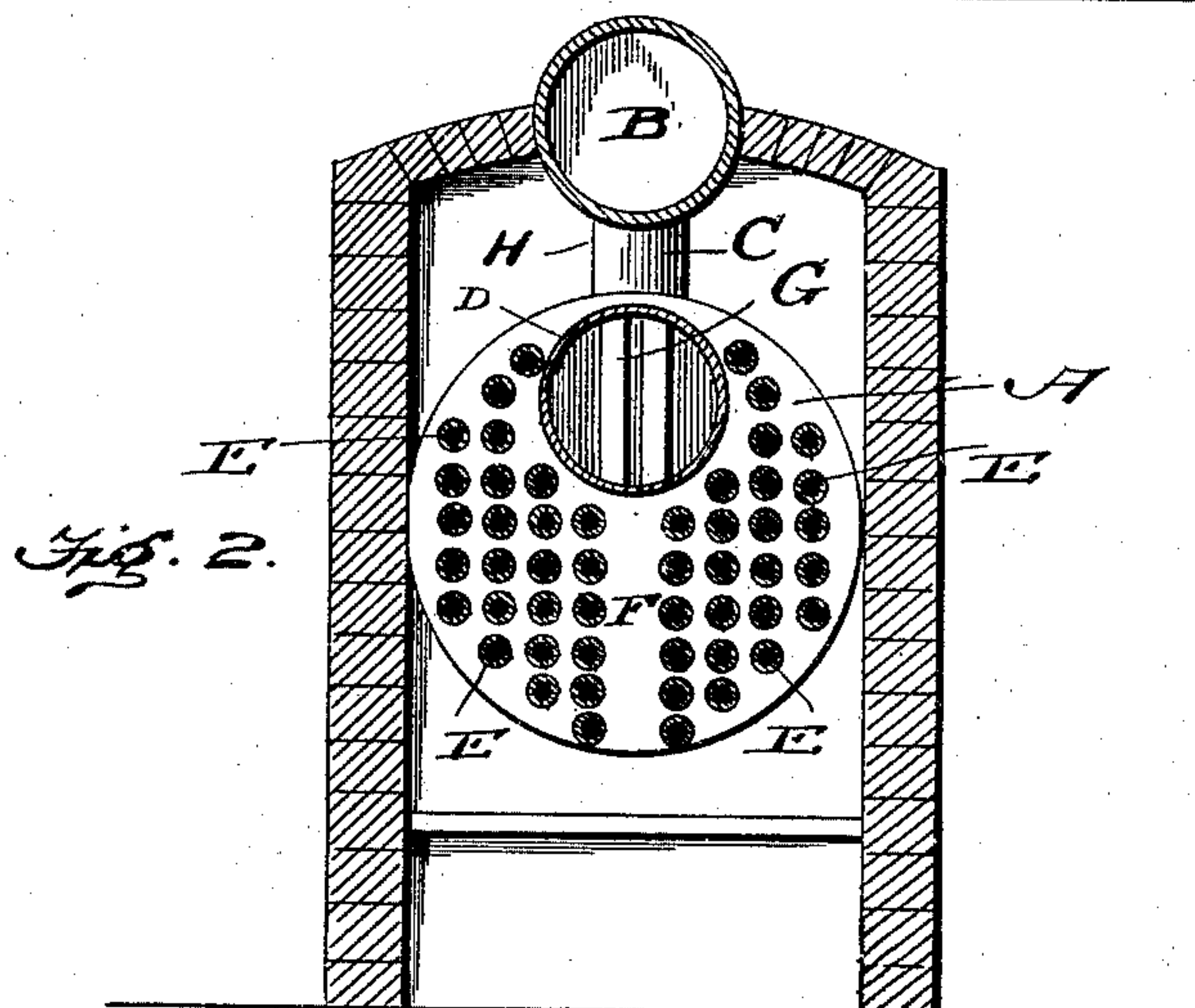
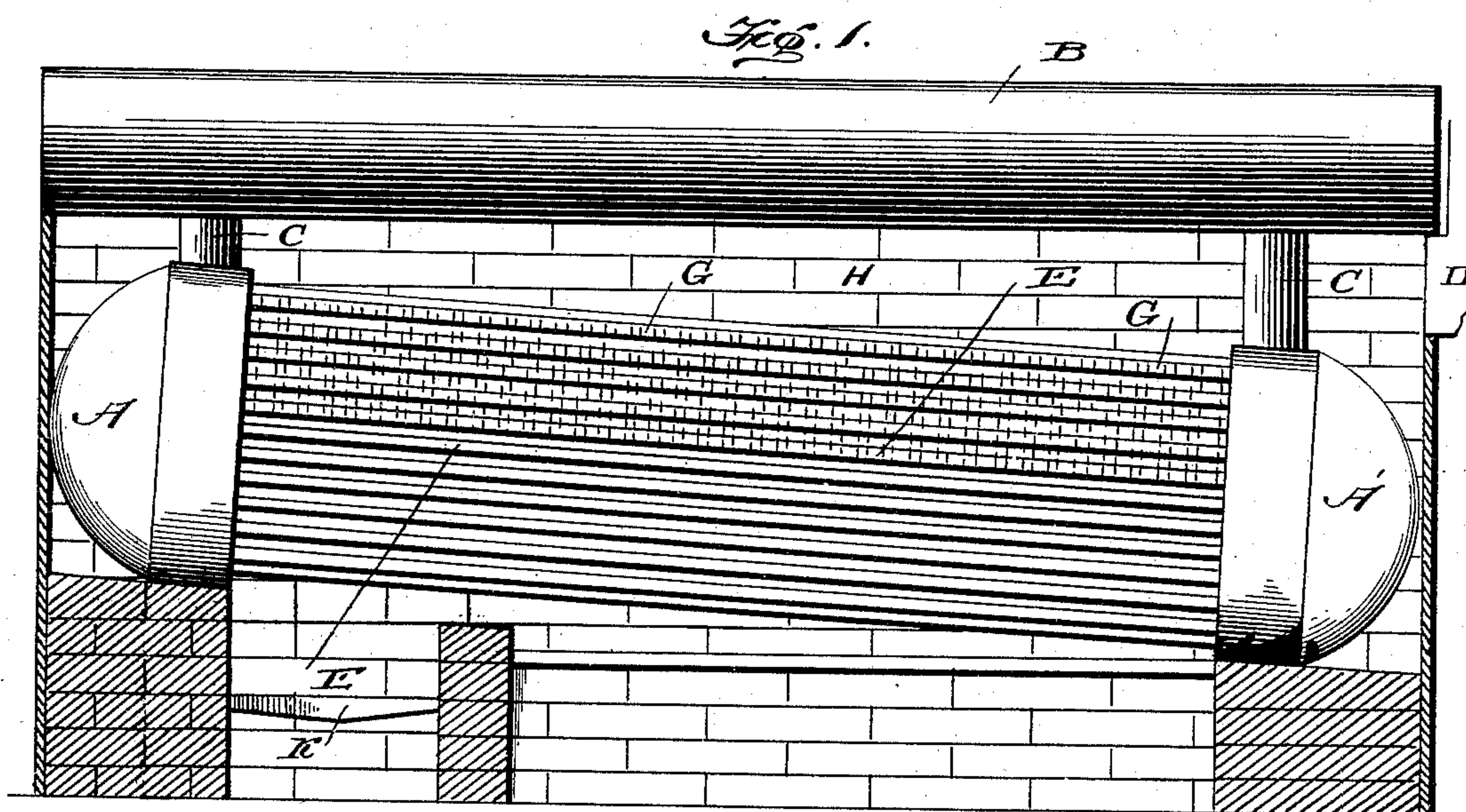


(No Model.)

J. VANES.
BOILER.

No. 505,735.

Patented Sept. 26, 1893.



Witnesses:
Wm. O. O'Connell
Arthur L. Bryant

Fig. 3.
John Vanes.
Inventor
By, Edson Bros.
Attys.

UNITED STATES PATENT OFFICE.

JOHN VANES, OF BRAZIL, INDIANA.

BOILER.

SPECIFICATION forming part of Letters Patent No. 505,735, dated September 26, 1893.

Application filed March 11, 1893. Serial No. 465,613. (No model.)

To all whom it may concern:

Be it known that I, JOHN VANES, a citizen of the United States, residing at Brazil, in the county of Clay and State of Indiana, have invented certain new and useful Improvements in 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 appertains to make and use the same.

My invention relates to improvements in water tube steam boilers, and the object of the invention is to provide a strong and durable boiler of the class described in which the heat from the furnace will be uniformly distributed against all of the water tubes and in which it will not be necessary to employ extra braces to keep the heads of the boiler in proper position on the tubes thereof.

With these ends in view, my improved boiler consists of two heads which communicate with a suitable steam drum, a main water tube connecting the heads and having a series of internal fire tubes which open through the sides thereof, and a series of auxiliary water tubes connecting the heads and arranged so as to provide direct passages from the furnace to the fire tubes in the main water tube.

My invention further consists in the peculiar construction and arrangement of parts as will be hereinafter more fully pointed out and claimed.

In the accompanying drawings—Figure 1 is a longitudinal sectional view through a steam boiler constructed in accordance with my invention. Fig. 2 is a transverse sectional view of the same; and Fig. 3 is a similar view of a slightly modified form.

Like letters of reference denote corresponding parts in the several figures of the drawings, referring to which—

A, A', designate the heads of my improved steam boiler which heads are preferably made in the form shown in Fig. 1 of the drawings and are designed to be supported by any suitable arrangement of masonry or brick work. The heads A, A', communicate with a steam drum B through short connecting pipes C; and said heads are connected by a main water tube D and a series of auxiliary water tubes E all of said tubes being riveted or otherwise suitably secured to flue sheets carried

by the heads. As shown in the drawings, the auxiliary water tubes are arranged in two main groups which extend on opposite sides and partially surround the main water tube. A passage or space F is thus formed between the two groups of auxiliary tubes E and said passage or space extends longitudinally of the boiler, and from the furnace or combustion chamber K below the boiler to the under side of the main tube D.

In the main tube D is arranged a series of short transverse fire tubes G which tubes open through opposite sides of said water tube and serve to conduct the products of combustion, generated in the furnace, from the passage or space F to a space H below the steam drum, said space communicating at one end with a suitable stack L.

The water in the auxiliary tubes E is heated by the contact therewith of the products of combustion from the furnace and the water in the main tube D is heated by the passage of said products of combustion through the fire tubes in said main tube.

In Fig. 3 of the drawings I have illustrated a slight modification of my improvements in which, instead of arranging the fire tubes G in two parallel lines, as in the preferred construction of my invention shown in Figs. 1 and 2, the said tubes are arranged in two sets which extend diagonally of each other and said tubes communicate at their upper end with the space between the water tubes and the steam drum and at their lower ends with passages F', F², formed among the auxiliary tubes E by arranging said tubes in three groups instead of two as in the preferred construction.

From the foregoing description it will be seen that I have provided a very simple, strong and durable boiler. By my construction the tendency of the pressure in the tubes to force the heads therefrom will be obviated without employing any additional or extra bracing but simply by making the heads in the form shown and by riveting to flue sheets carried by the head a main water tube of sufficient size to overcome the said tendency of the pressure in the tubes.

I am aware that changes in the form and proportion of parts and details of construction of the devices herein shown and de-

scribed as an embodiment of my invention can be made without departing from the spirit or sacrificing the advantages thereof, and I therefore reserve the right to make such
5 changes and alterations as fairly fall within the scope of the same.

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

10 A boiler consisting of two heads which are connected with a steam drum, a main water tube connecting the heads and having a series

of internal fire tubes which open through the sides thereof, and a series of auxiliary water tubes connecting the heads and arranged in 15 groups to form a passage that aligns with the fire tubes in the main water tube, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN VANES.

Witnesses:

WM. E. CARPENTER,
R. D. FURNEY.