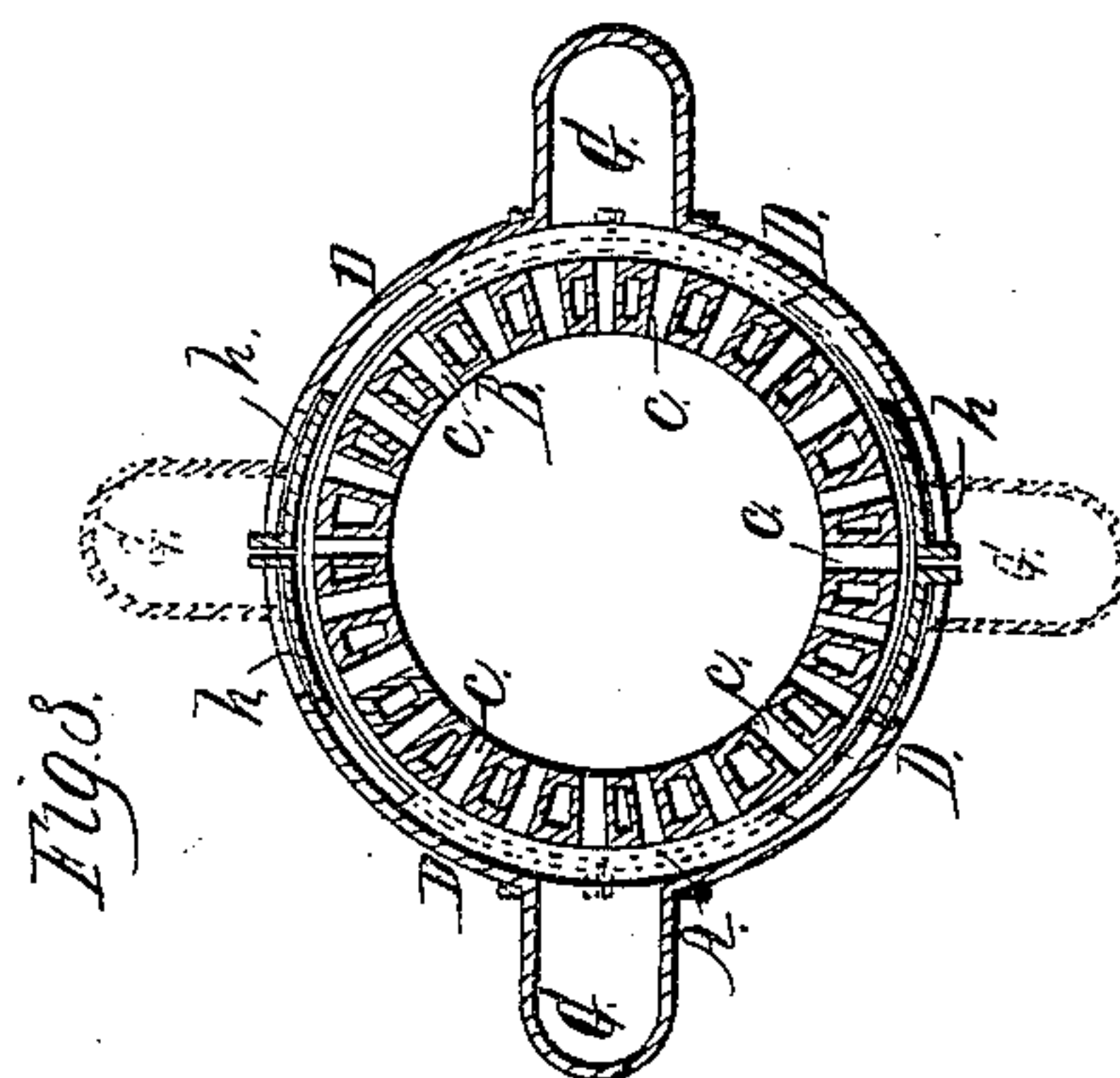
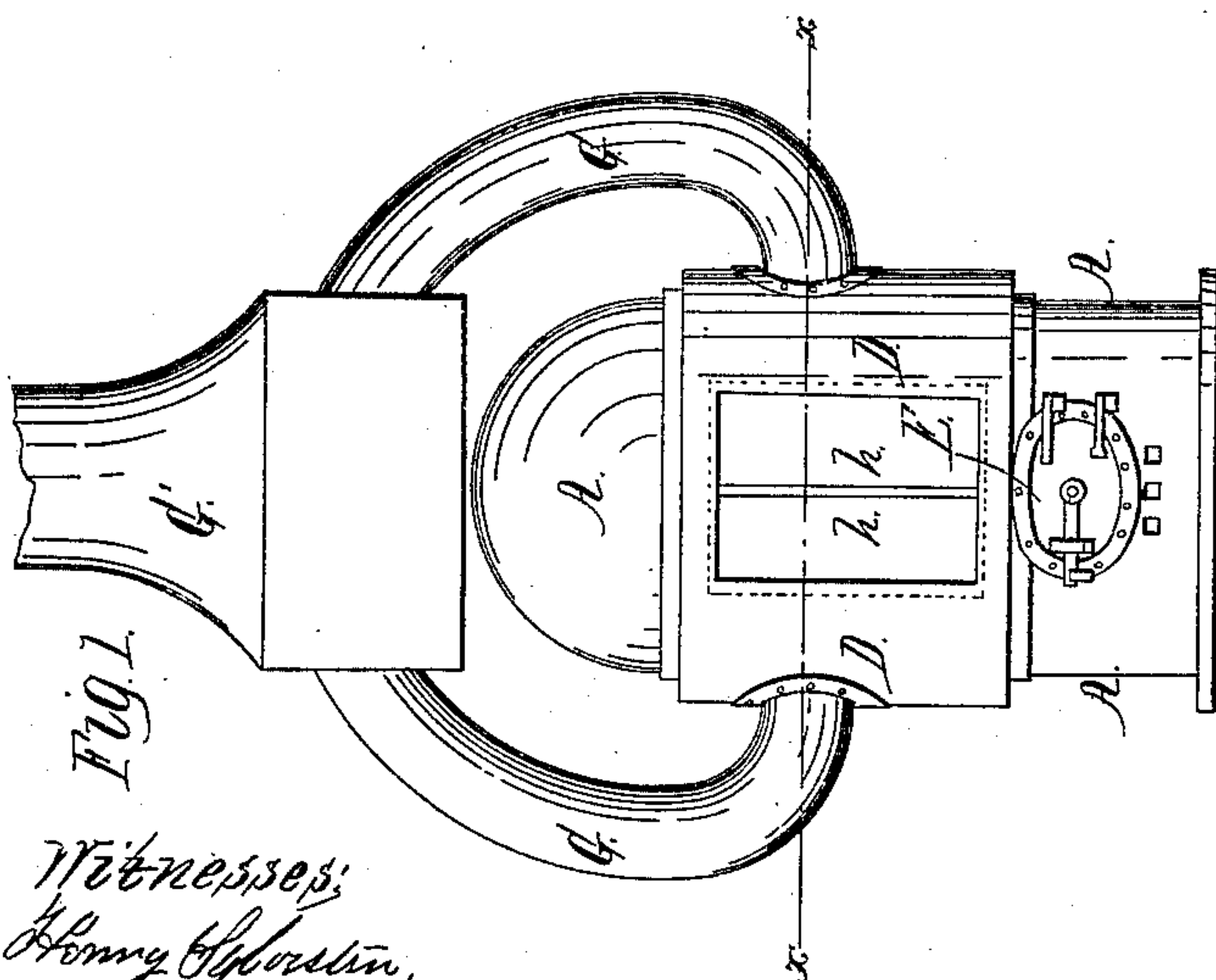
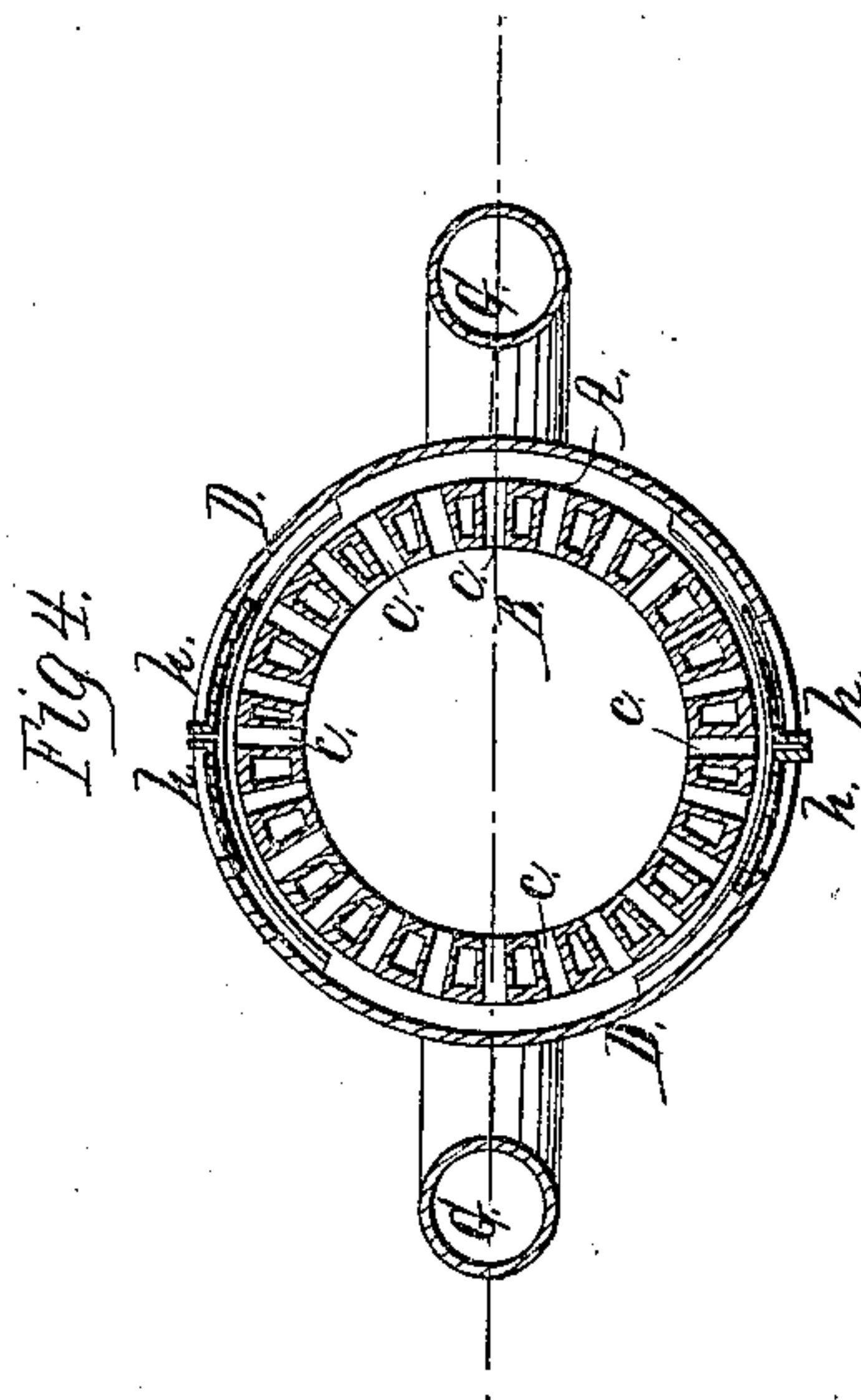
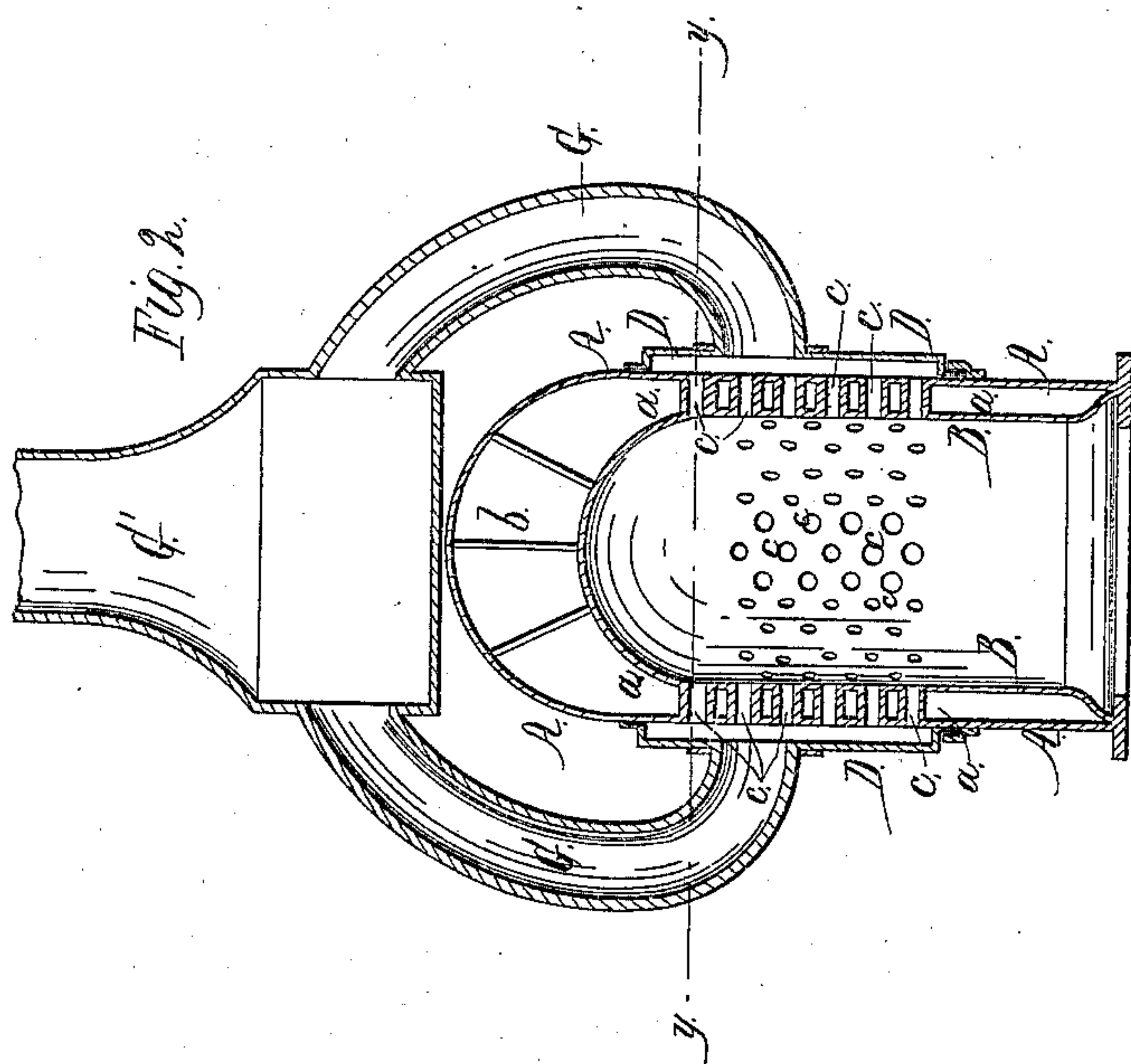


*W. Brannigan,*  
*Steam-Boiler Fire-Tube.*  
*N<sup>o</sup> 60,991.                      Patented Jan. 8, 1867.*



*Witnesses:*  
*Henry G. Martin.*  
*Edw. Schaefer.*

*Inventor:*  
*W. Brannigan*  
*Mar. 21, 1867*



# United States Patent Office.

WILLIAM BRANAGAN, OF BURLINGTON, IOWA.

*Letters Patent No. 60,991, dated January 8, 1867.*

## 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, WILLIAM BRANAGAN, of Burlington, in the county of Des Moines, and State of Iowa, have invented an Improvement in Upright Steam Boilers; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing, making a part of this specification, in which—

Figure 1 is a front elevation of the boiler.

Figure 2 is a diametrical section through the same.

Figure 3 is a section taken in the horizontal plane indicated by red line *x x*, fig. 1.

Figure 4 is a section taken in the horizontal plane indicated by red line *y y*, fig. 2.

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

The main object of this invention and improvement in the construction of upright steam boilers is to obtain economy in fuel and space, by conducting the heated products of combustion from the fire-chamber directly through the horizontal transverse flues which pass through the water space and into a jacket which surrounds the boiler, and is capable of being revolved, so that both the inside walls, which form said water space, will be subjected to the direct action of heat, 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 wall of the boiler, which is an upright cylinder, terminating at its upper end in a dome, as shown in fig. 2; and B represents the inner wall of the boiler, which corresponds in shape to the wall or shell A, but which is somewhat smaller than this wall, so as to leave the water space *a* and steam space *b*. These two shells, A B, are suitably united together at their lower ends, and stayed at their upper ends, so as to possess great strength. The fire-chamber fills the entire space enclosed by the inner shell B, and the heated products of combustion rising in this chamber, pass off through a great number of small tubes, *c c*, which extend through the water space *a*, as shown in figs. 2, 3, and 4. These short tubes, *c*, unite the two upright shells of the boiler, and completely surround the same, each tube radiating from the axis of the boiler. These tubes *c* may extend from a point which is directly above the fire-door E to the termination of the cylindrical portions of the shells, so that there will be free draught and free escape of the products of combustion from the fire-chamber. Surrounding that portion of the boiler which is thus provided with flues or tubes, *c*, is a cylindrical jacket, D, which forms a space, *g*, into which the heat and gases, escaping from the fire-chamber through flues *c*, enter. This cylindrical jacket, D, is closed at its upper and lower ends, and so applied to the outer shell of the boiler, that it can be revolved around the same. Jacket D is provided with one or more openings through it, which are closed by the doors *h*; and it is also provided with branch-pipes, G G, leading from it and communicating at their upper ends with the main smoke pipe G', which latter is arranged directly over the boiler, and in a vertical line, coinciding with its axis. The jacket D, with its attachments, is made to revolve around the boiler, when it is desired to have access to the flues *c* for cleaning them. If the jacket D was rigidly attached to the outer shell of the boiler, then access could be had only to those flues, *c*, which are directly opposite the opening or openings through the jacket. By allowing this jacket to revolve, as above stated, the opening through it can be moved opposite all of the flues *c*, and they can be readily cleaned and kept free from cinders. The jacket D not only serves as a means for applying the heat of the escaping products of combustion to the outer wall or shell A of the boiler, and thus having the water space *a* heated on both sides, but it also serves the important purpose of preventing cold currents of air from impinging upon the outer shell which it surrounds. This jacket thus serves as a heat retainer as well as a means for utilizing the escaping heated gases.

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

Applying a jacket, D, to a boiler, which is constructed substantially as described, so that this jacket can revolve around the boiler, substantially as specified.

WILLIAM BRANAGAN.

Witnesses:

CHAS. SOWDERS,

WM. J. POLLOCK.