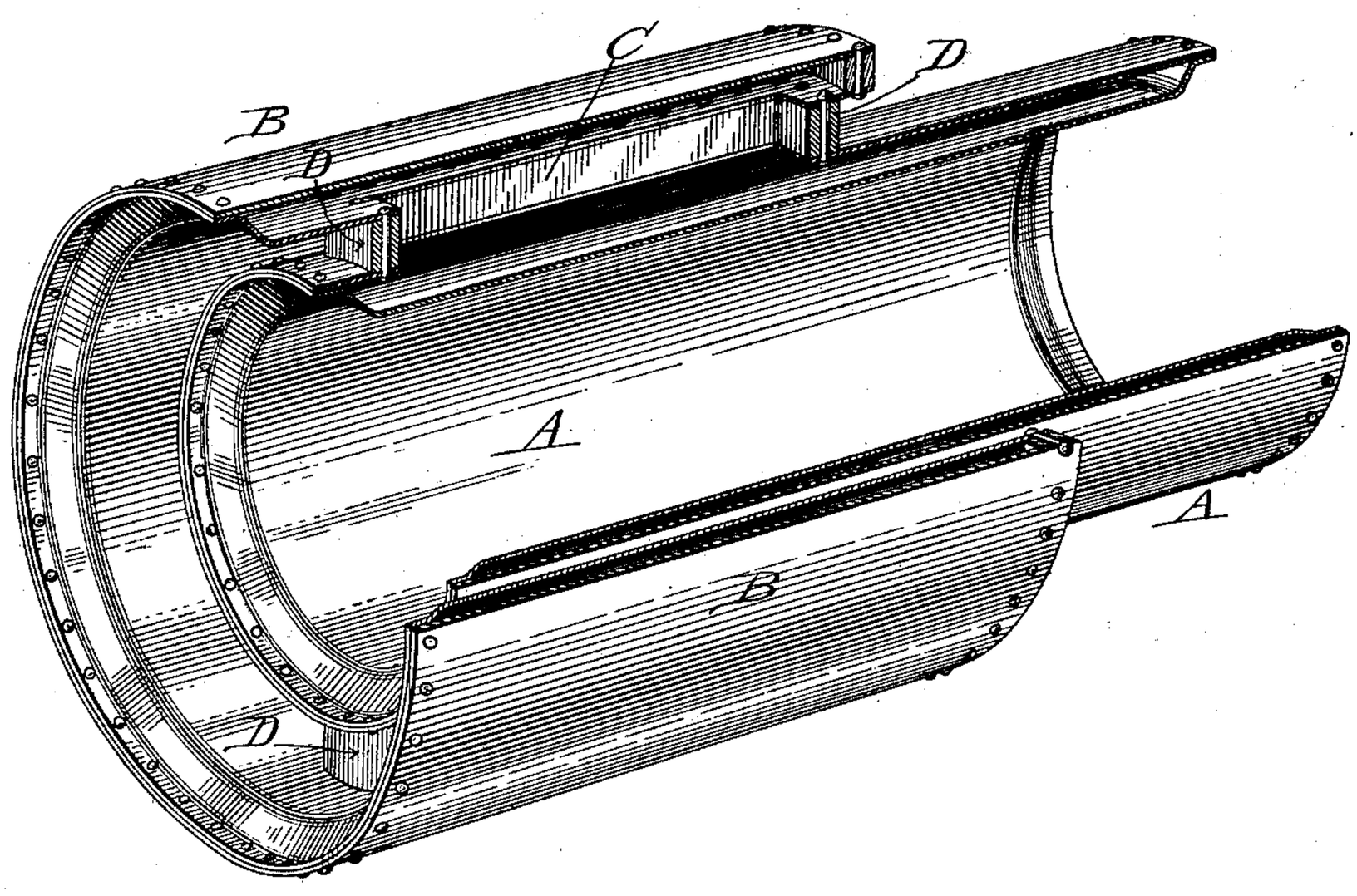
(No Model.) 2 Sheets—Sheet 1.

G. W. JOHNSON.

BOILER.

No. 592,509. Patented Oct. 26, 1897.

Fig. 1.



Attest;
C. E. Burdine.
D. E. Burdine.

Inventor
Geo. W. Johnson,
by Dodger & Son
Attys.

(No Model.) 2 Sheets—Sheet 2.

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Fig. 2.

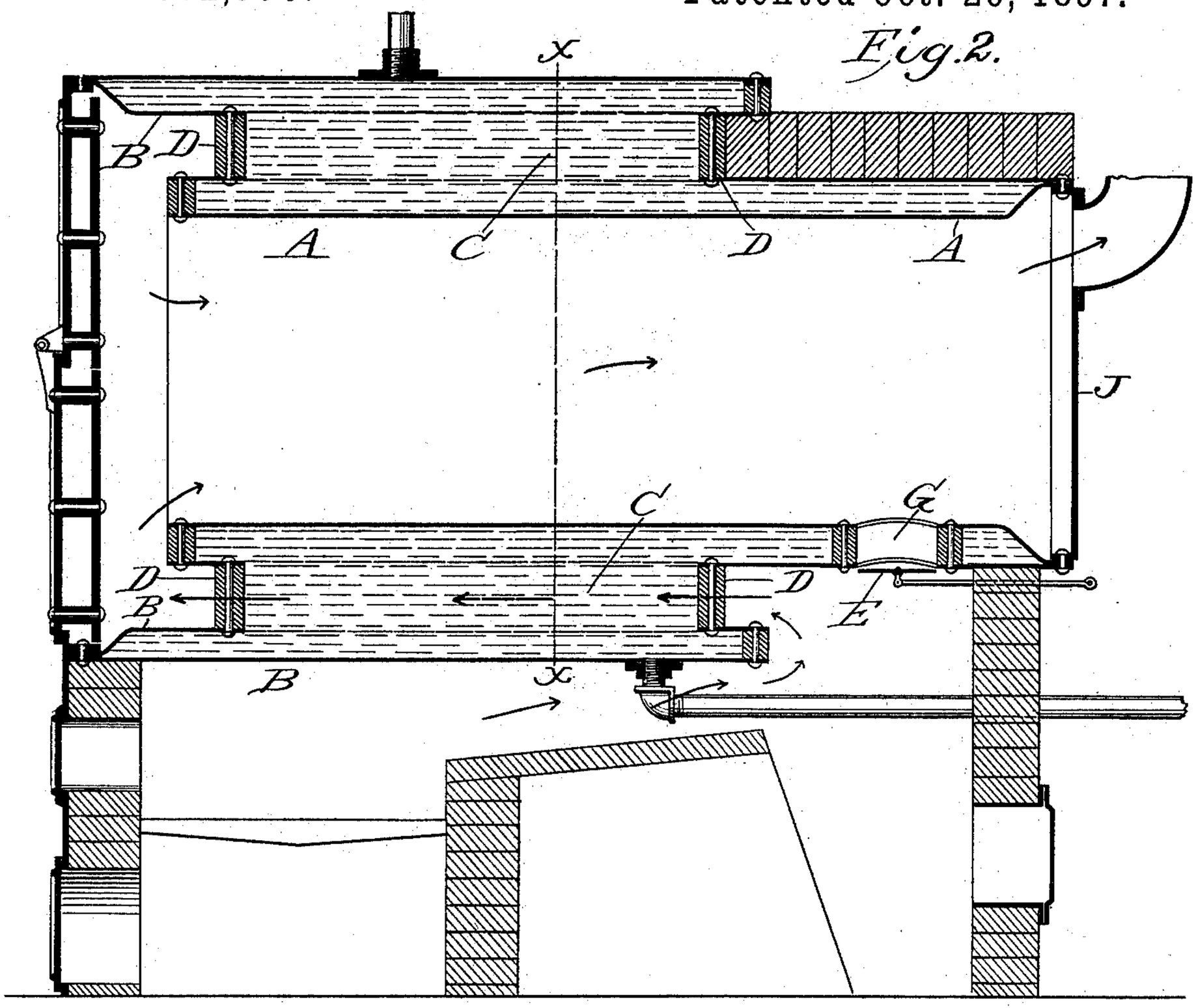
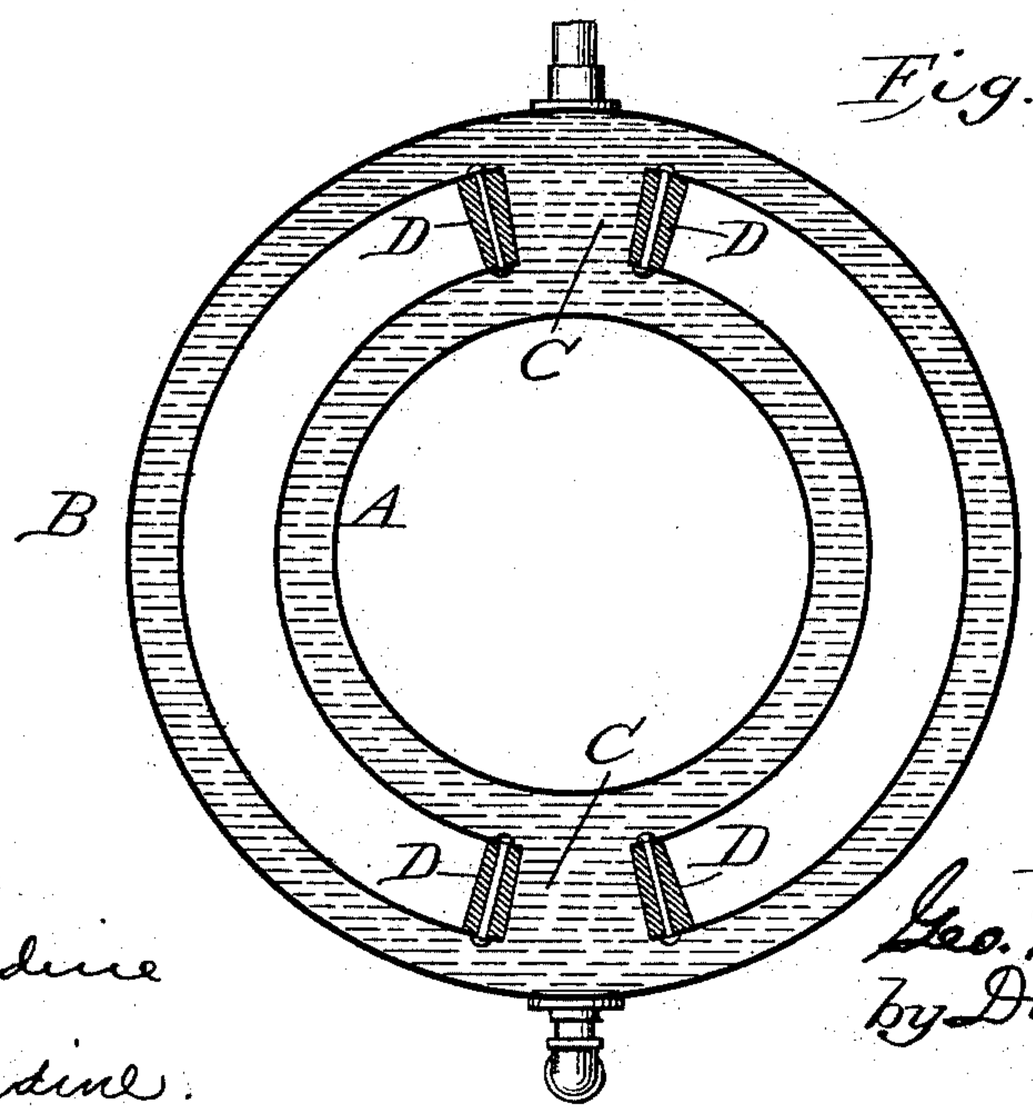


Fig. 3.



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C. C. Burdine
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Inventor:
Geo. W. Johnson,
by Dodger & Sons
Att'ys

UNITED STATES PATENT OFFICE.

GEORGE W. JOHNSON, OF GENEVA, NEW YORK, ASSIGNOR TO THE NEW YORK CENTRAL IRON WORKS COMPANY, OF SAME PLACE.

BOILER.

SPECIFICATION forming part of Letters Patent No. 592,509, dated October 26, 1897.

Application filed May 11, 1897. Serial No. 636,050. (No model.)

To all whom it may concern:

Be it known that I, GEORGE W. JOHNSON, a citizen of the United States, residing at Geneva, in the county of Ontario and State of New York, have invented certain new and useful Improvements in Boilers, of which the following is a specification.

This invention relates to steam or hot-water boilers of that class designed for heating buildings; and the invention consists in constructing a boiler of two annular shells, one within the other, connected and arranged in a novel manner, as hereinafter more fully set forth.

Figure 1 is a perspective view of the boiler with a portion broken away to show the interior connection. Fig. 2 is a longitudinal vertical section showing the boiler set ready for use, and Fig. 3 is a transverse section on the line $x\,x$ of Fig. 2.

The object of my present invention is to produce a boiler having a large heating capacity without the use of tubes, that will utilize the fuel to the best advantage, that will be easy to clean, and cheap of construction. This boiler is designed to be used either for steam or hot-water heating, it being represented in Fig. 3 as being filled with water as it would be when used for hot-water heating.

To construct a boiler on my plan, I make an outer shell B and also another shell A of smaller diameter but of greater length, as shown in Figs. 1 and 2.

In the outer wall of the inner shell A at opposite sides I cut an oblong opening, as shown at C, Fig. 1, and in the inner wall of the outer shell B, I cut two corresponding openings, these two walls then being united by placing between them and around each of the holes a casting D, to which the two walls are securely fastened by bolts which extend through all three and have their ends riveted down, as usual.

The inner wall of the inner shell A is then put in place and securely riveted at its ends in the usual manner, after which the outer wall of the outer shell B is put in place and riveted fast, when the boiler is complete with the exception of tapping the ordinary holes for the necessary connections.

As shown in Fig. 2, an opening G is made through the inner shell A near its rear end for a direct-draft passage, to which a damper E will be applied.

In uniting the two shells care is taken to so arrange them in relation to each other that the inner shell A shall project at the rear end, while the outer shell B shall project at the front end, by which means, when the boiler is set, as shown in Fig. 2, a triple draft is secured.

While I prefer to make the inner shell considerably longer than the outer one, as shown in Fig. 2, it is obvious that they may be of equal length or practically so and still be set and operated in the same manner, it only being necessary that the shells shall project one beyond the other at their opposite ends far enough to rest upon the supporting-walls and leave a space for the passage of the products of combustion in the manner shown. By making the inner shell longer the heating surface is increased, a longer travel is given to the products of combustion, and the direct-draft opening can be thrown farther back and more in line with the smoke-pipe, and hence I prefer to make them as shown.

It is obvious that instead of the casting D a flanged plate of wrought iron or steel may be used, it being optional with the manufacturer to use one or the other, as may be most convenient or cheapest.

In like manner the ends of the shells may be flanged and riveted together or they may have a cast or malleable iron ring interposed, as may be preferred, both forms being shown.

While I have shown the two shells as being arranged concentrically, as in Fig. 3, it is obvious that they may be arranged eccentrically one to the other, and in some cases it may be desirable to so arrange them and thus make the intervening space or flue at the top narrower than at the lower side, as the tendency of the heat and flame is to rise to the upper side.

This boiler is designed to be set and used in a horizontal position, as represented in Fig. 2. The rear or projecting end of the inner shell A will be closed by a cast-iron head or plate J, and which may be bricked in, if desired, while the front end of both shells will be covered, preferably, by two plates having

an air-space between them to prevent radiation of the heat, a portion or the whole of this front being hinged to open, so as to admit of free access to clean away the ashes and soot that accumulates on the shells.

It will be seen that as there are no tubes and only the surfaces of the two shells to be cleaned and as these can readily be got at from the front the cleaning can be very easily and quickly effected.

In use the exposed surface of the boiler may, if desired, be all bricked in or covered with non-conducting material to prevent waste of heat from the water or steam.

When set as represented in Fig. 2, it will be seen that it has a triple draft—that is, the products of combustion first pass backward under the outer shell, thence forward between the two shells, and thence back through the interior of the inner shell—thus holding them in contact with the heating-surfaces for a longer time than usual, and thereby utilizing the fuel to the best advantage. Its simplicity of construction enables it to be made very cheaply, while the absence of tubes with their multiplicity of joints and unequal strains renders it less liable to injury.

It is obvious that instead of the two oblong openings C for connecting the two shells smaller openings may be made and more of them be used; but I prefer the plan shown, because it is desirable to avoid a multiplicity of joints and also because these long openings insure a free circulation of the water in the two shells.

Having thus described my invention, what I claim is—

1. A boiler consisting of two annular shells arranged one within the other with their water-spaces connected, the inner shell projecting at one end, and the outer shell projecting at the opposite end, whereby when set as shown, the products of combustion impinge upon the exterior of the outer shell, then pass between the two shells, and back through the interior of the inner shell, substantially as and for the purpose set forth.

2. A boiler consisting of two shells one within the other, the two shells having their water-spaces connected at opposite sides by oblong openings, and the inner shell being provided with an opening to serve as a direct-draft passage, substantially as shown and described.

In witness whereof I hereunto set my hand in the presence of two witnesses.

GEORGE W. JOHNSON.

Witnesses:
LEWIS D. COLLINS,
D. B. BACKENSTOSE.