(No Model.)

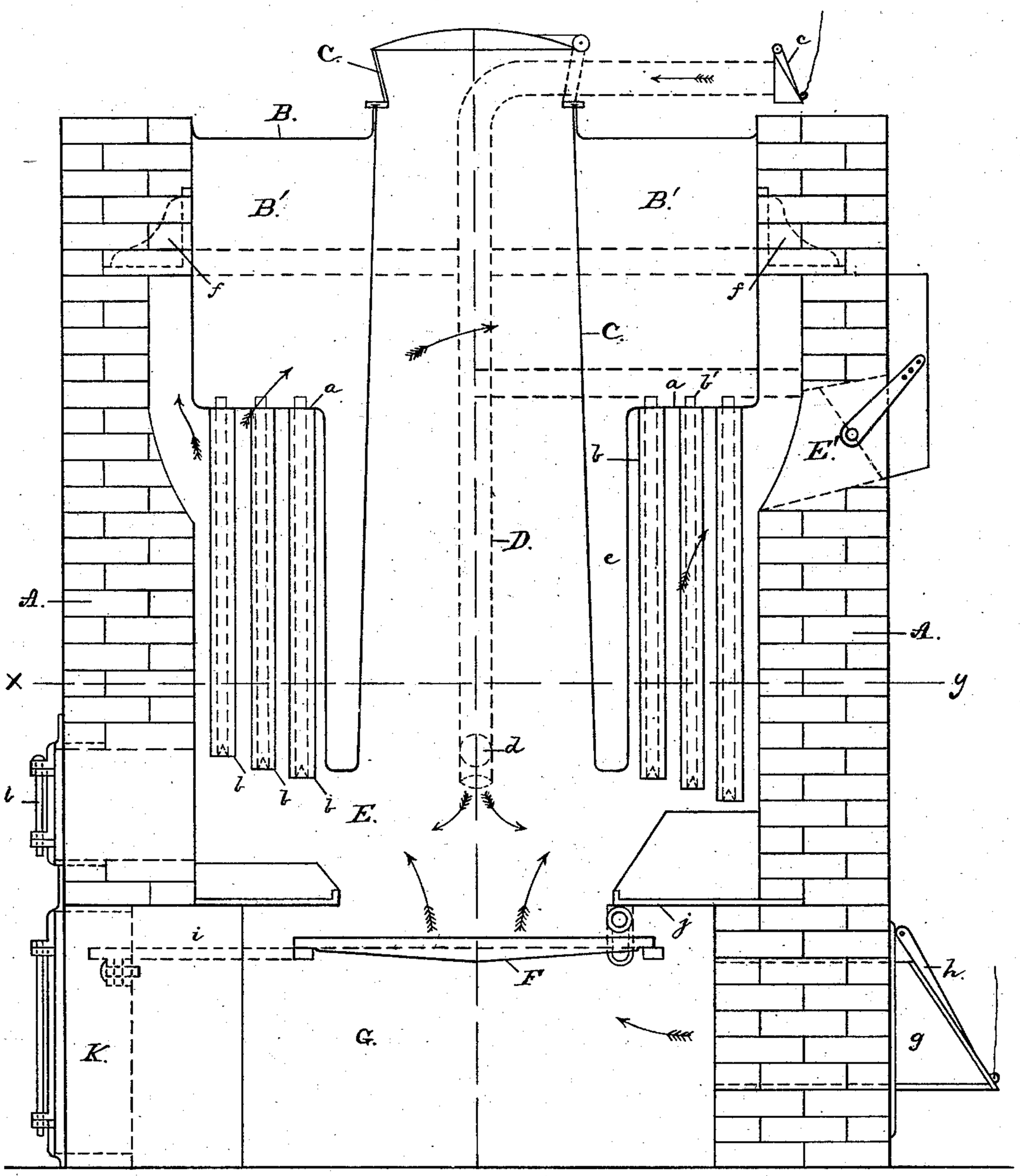
2 Sheets—Sheet 1.

J. C. McNEIL.

Boiler.

No. 242,834. **Patented June 14, 1881.**

Fig. 1.



WITNESSES

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(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

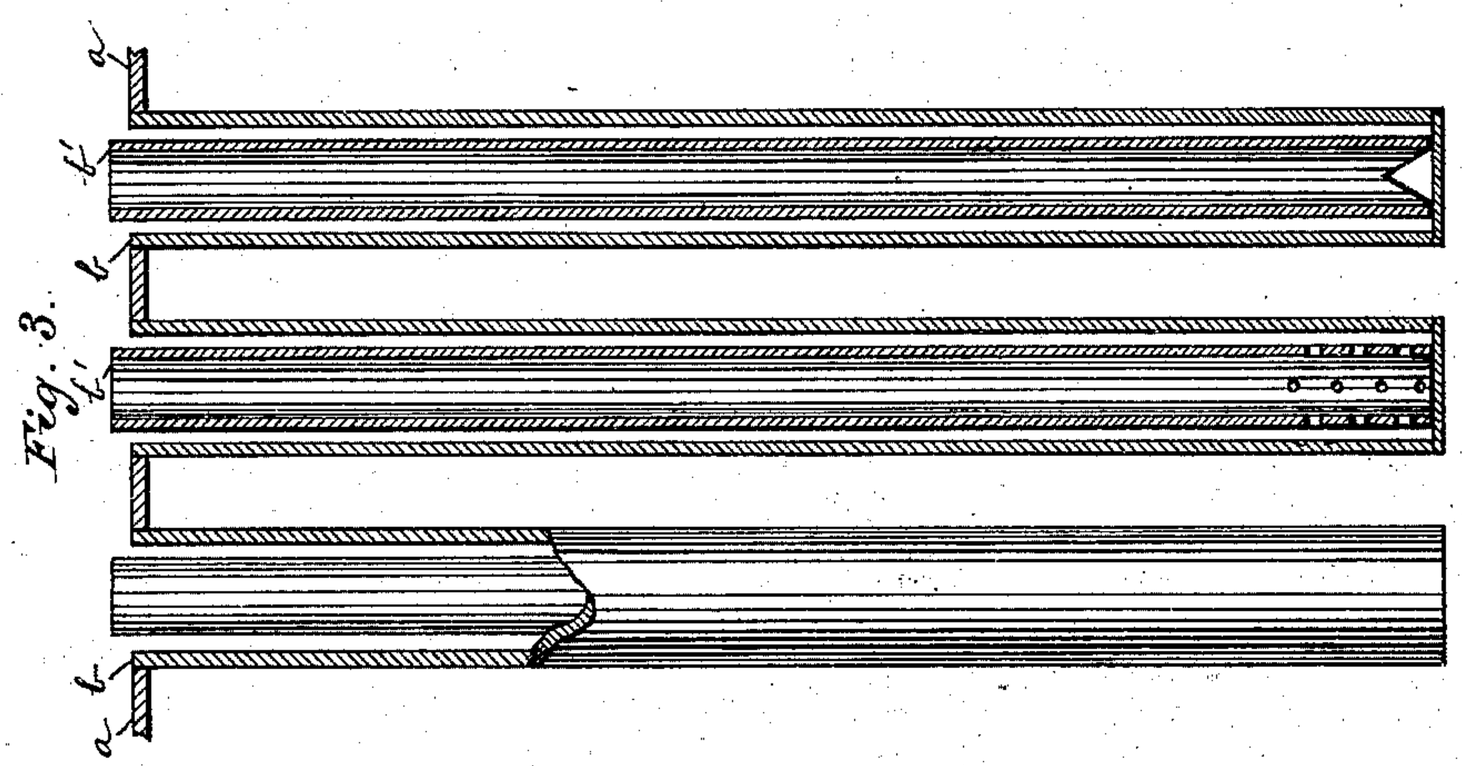
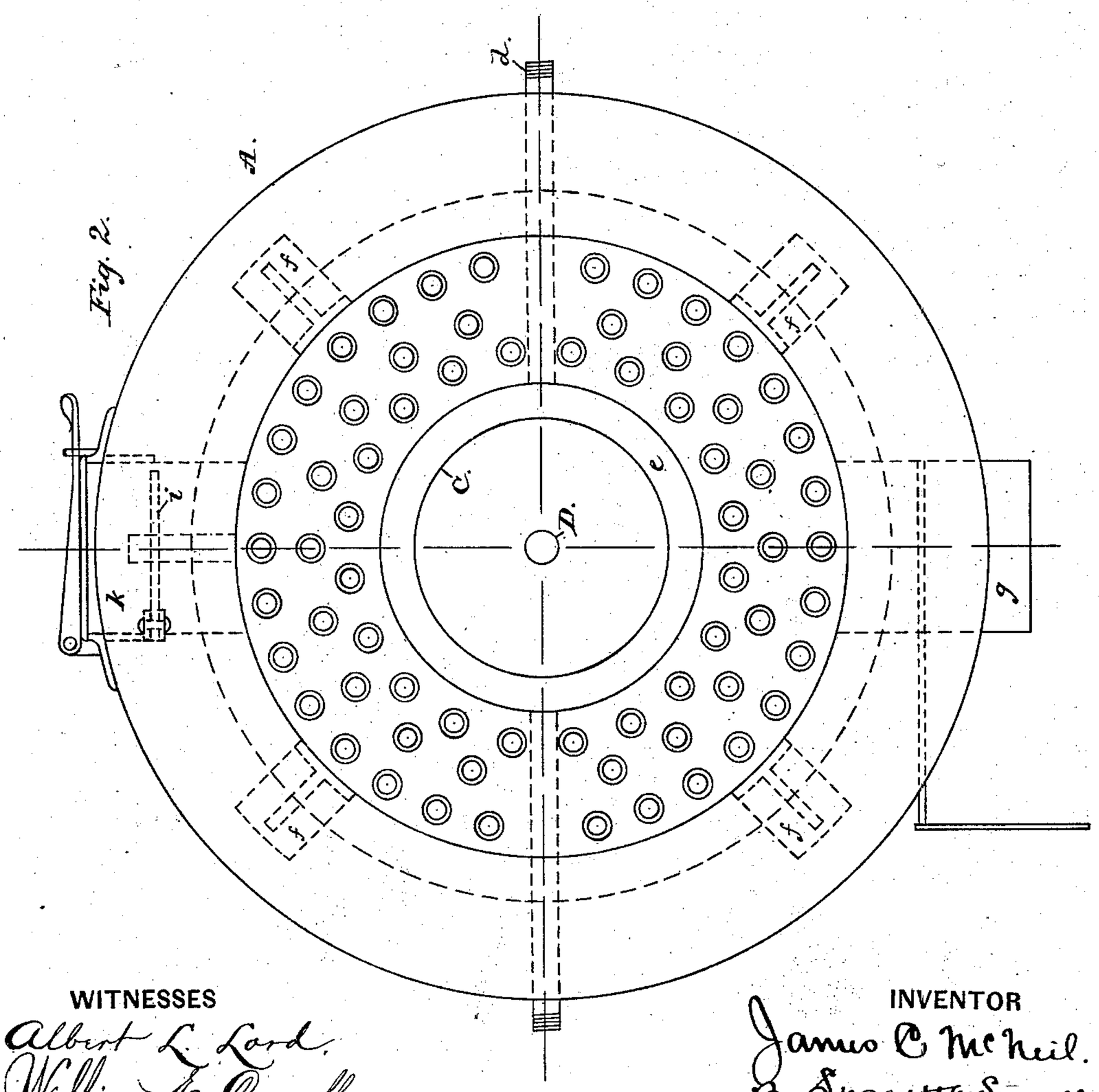


Fig. 2.



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UNITED STATES PATENT OFFICE.

JAMES C. McNEIL, OF AKRON, OHIO.

BOILER.

SPECIFICATION forming part of Letters Patent No. 242,834, dated June 14, 1881.

Application filed March 3, 1881. (No model.)

To all whom it may concern:

Be it known that I, JAMES C. MCNEIL, of Akron, in the county of Summit and State of Ohio, 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 pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to drop-tube and magazine boilers; and it consists in the peculiar construction of the boiler and drop-tubes, and in the arrangement of air pipes and flues.

In the drawings, Figure 1 is a vertical sectional view of my boiler. Fig. 2 is a horizontal sectional view of the same, taken on the line *x y*, Fig. 1. Fig. 3 is a detached view of my drop-tubes, showing the manner of providing them with circulating-tubes.

In the drawings, A is a wall of brick or any other suitable material. *f* are brackets set in wall A, said brackets affording a means of support for the boiler.

B is the boiler, the same being provided with drop-tubes *b*, having closed bottoms, and also having circulating-tubes *b'*, which have both ends open, as shown in Fig. 3.

C is a magazine, which passes through the center of the boiler B, and is provided at its lower end with a water-space, *e*.

D is an air-pipe, which passes through the center of the magazine C. This air-pipe is turned at a right angle at its upper end, and passes out at the upper part of magazine C, where it is provided with a valve or damper, *c*.

E is the furnace or fire-place of my boiler, and is provided with a grate, F. This grate F is hinged at its rear end either to the fire-brick plate *j*, as shown in the drawings, or it may be hinged to the wall A in any suitable manner. The forward end of grate F is supported on an adjustable arm, *i*, said arm being adjustably attached to the frame of the ash-door *k*.

E' is the chimney-flue, which may be provided with a damper, as shown in Fig. 1 of the drawings.

l is the fire-door of my furnace. G is the ash-pit. *g* is a flue entering the ash-pit G, the same being provided with a damper, *h*.

The operation of my device is as follows: Water being supplied to the boiler through the feed-pipe *d*, it fills the water-space *e*, drop-tubes *b*, and also partially fills the chamber B'. The fire is now started on the grate F and the magazine C is filled with fuel. The products of combustion, starting from the fire on the grate F, take the course of the arrow, passing around and between the drop-tubes *b*, and around the water-space *e* and the lower portion of the chamber B', and from thence out through the flue E' to the chimney. As the heat strikes the drop-tubes *b* the water which is nearest the circumference of said drop-tubes is heated and passes up, and the cold water falls to the bottom.

Here will be seen the reason why I provide my drop-tubes *b* with circulating-tubes *a*, the object of said tubes *a* being to provide a means of circulation in the drop-tubes *b* and prevent them from becoming clogged with sediment, and also to prevent the water from being forced out by the too quick formation of vapor. As shown in Fig. 3 of the drawings, these circulating-tubes are small cylindrical tubes, located centrally in the drop-tubes, and extending a short distance above the tops of said drop-tubes, and are provided at their lower ends with openings, either by cutting away part of the circumference or by drilling holes in them, as shown, thus allowing the hot current to ascend outside of them and the colder current to descend within them and establish a circulation and keep the drop-tubes from becoming clogged.

I make my drop-tubes *b* a little longer than the magazine C, and also make each succeeding row longer than the inner one, except at the fire-door, where I have the outer ones short and the inner ones long, so they will not drop down before the door and be in the way. My reason for making one row shorter than the succeeding one is to facilitate their removal from the crown-sheet by means of a pipe-tongs.

I have provided the lower part of the magazine C with a water-space, *e*, the main object of said water-space *e* being to keep that portion of the magazine which comes in direct contact with the fire from burning out. It will be seen by reference to the drawings that I locate my water-supply or feed pipes *d* at the lower

part of this water-space *e*, and thereby keep this part of the boiler always the coolest. The current of water entering prevents sediment from forming at this point. I also provide an air-pipe, D, which passes down through the center of the magazine C, and also a short distance below it. The object of this pipe is to supply air to the fire from above, which promotes a more perfect combustion.

The quantity of air to be admitted to the fire is regulated by means of the valve or damper *c*, which is operated in any suitable manner.

The fire-place or furnace of my boiler I provide with a grate F, the same being hinged at the back end, either to the plate *f* or to the wall A. The forward end of grate F is supported on the adjustable arm *i* in such a manner that as the arm *i* is lowered the forward end of the grate F is lowered a small distance in the ash-pit G, and the clinkers and dirt can be removed directly to said ash-pit without the necessity of drawing them through the fire-door *l*.

At the back of the ash-pit G, I have provided a flue, *g*, the object of said flue being to supply air to the fire through the said ash-pit G, and thence through the grate F. This flue *g* has a damper which regulates the supply of air to be admitted to the fire by means of said flue.

What I claim is—

A magazine-boiler consisting of the following parts: the boiler B′, provided with a depending water-space, *e*, water-supply pipe *d*, magazine C, air-pipes D, drop-tubes *b*, of gradually-increasing length from the water-space *e* to the inner walls of the furnace, excepting at the furnace-door, where the tubes gradually increase in length from the walls of the furnace to said water-space, the several parts being constructed and arranged substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JAMES C. McNEIL.

Witnesses:
H. C. SANFORD,
W. H. SANFORD.