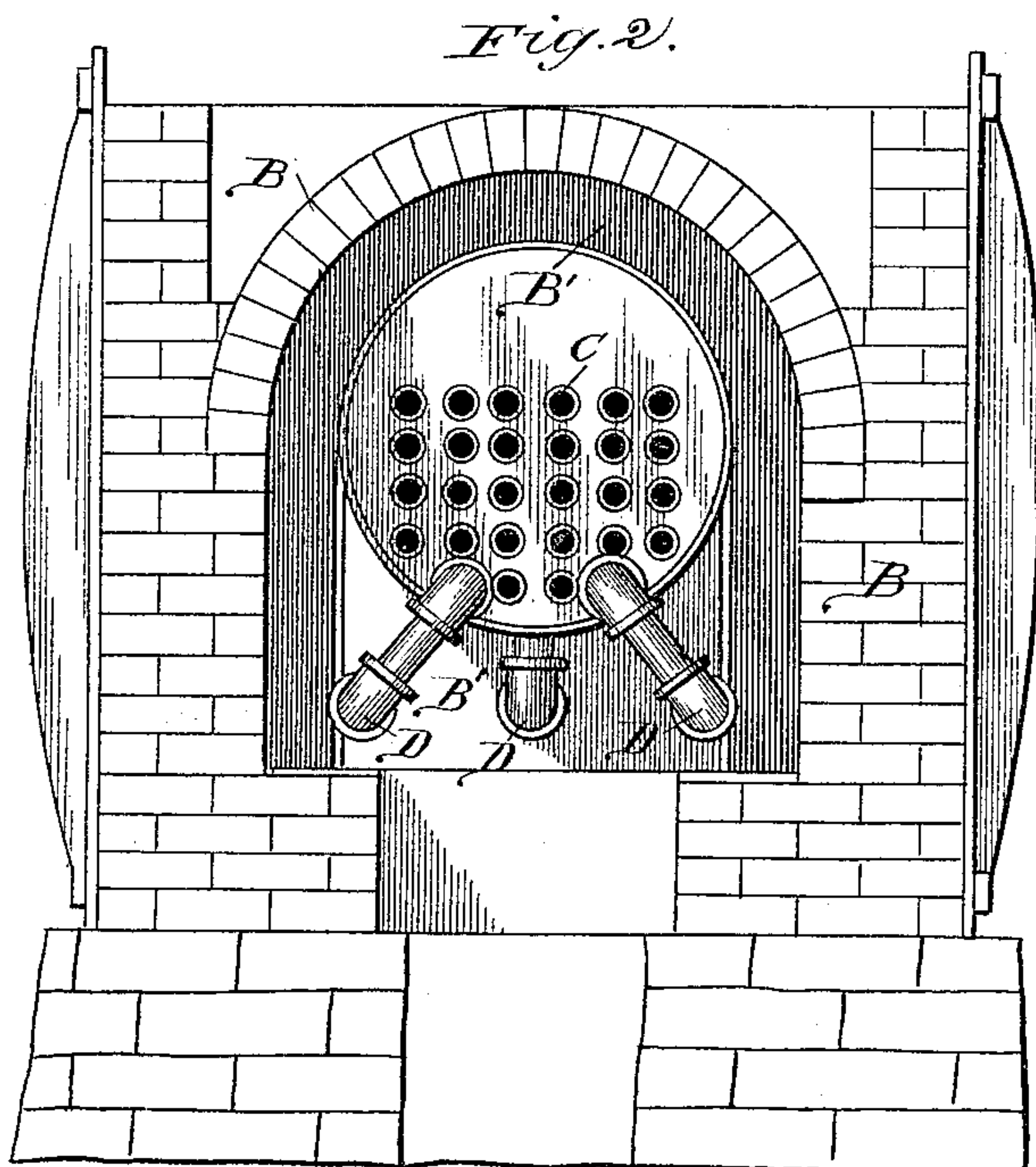
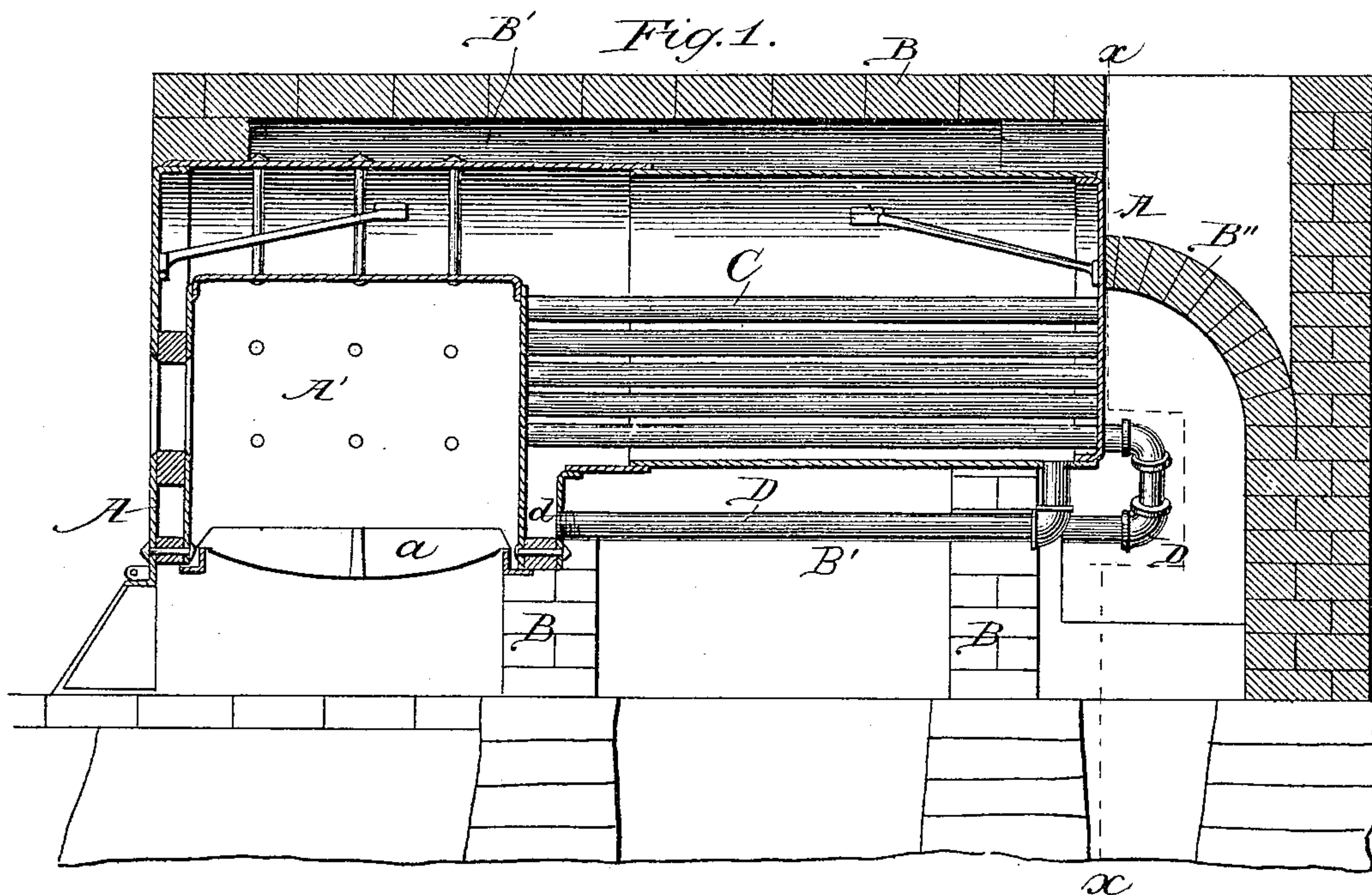


(No Model.)

L. H. PRENTICE.
BOILER.

No. 327,016.

Patented Sept. 29, 1885.



Witnesses.
W. Rossiter
Frank H. Woodcock

Inventor.
Leon H. Prentice
By *Merriam & Whipple*
Attys.

UNITED STATES PATENT OFFICE.

LEON H. PRENTICE, OF WAUKEGAN, ILLINOIS.

BOILER.

SPECIFICATION forming part of Letters Patent No. 327,016, dated September 29, 1885.

Application filed March 6, 1885. (No model.)

To all whom it may concern:

Be it known that I, LEON H. PRENTICE, of Waukegan, Illinois, have invented certain new and useful Improvements in Boilers for Steam-Heating, of which the following is a specification.

The improvements relate to the ordinary locomotive or fire-box boiler used for heating purposes; and the object is, first, to cause a circulation of the water in the boiler from the rear end to the bottom of the fire-box, and, second, to increase the heating-surface exposed to the fire.

The accompanying drawings illustrate the invention.

Figure 1 is a longitudinal section of a boiler of the class named incased in brick in the manner designed. Fig. 2 is a cross-section at *x x*, Fig. 1.

A designates the boiler-shell, A' the fire-box, and *a* the fire-grate, all of common construction. The boiler is inclosed in brick-work B, which is of such construction as to leave an open space, B', for the passage of heat around the outside of the shell.

The boiler is provided with common interior flues, C, extending from the fire-box through the boiler and out at the opposite end. An arch, B'', is closed over the open ends of these interior flues in such manner as to direct the flame and heat passing out of them back under the boiler and up through the space B' to the chimney. (Not shown, but of ordinary construction.)

One or more pipes, D, connect the water-space around the bottom of the fire-box, as at *d*, with the water-space at the opposite end of the boiler, so as to allow a circulation of the water through them from the rear end of the boiler to the space around the bottom of the fire-box. In addition to affording this circulation, these pipes are exposed to the fire and heat emitted from the interior flues, and thus afford increased heating-surface.

I am aware that pipes or tubes have been employed for causing circulation in steam-boilers, as shown in patents to C. Mason, February 2, 1869; E. B. Sintzenich, August 9, 1870, and J. B. Collan, October 11, 1853. In Mason's boiler the pipes are arranged at the water-line and near the bottom of the boiler, and the circulation is through a vertical pipe

from the top to a cross-cylinder or mud-pipe of larger size under the boiler, thence to the bottom pipe, and thence through various openings or connections between this pipe and the boiler into the boiler, thus causing a vertical circulation from the top to the bottom of the boiler. In Sintzenich's boiler the circulating-tubes likewise connect the steam-space with the water-space or water-bottom and cause a vertical circulation. The Collan patent is for a detachable lining for the sides and ends of fire-boxes, consisting of one or more tubes connected with the adjacent water-space by means of hollow bolts.

I make no claim to any of the above or similar boilers, but purpose to accomplish a different result—namely, cause the water to flow from the rear end of the bottom of the boiler to the bottom of the fire-box by one or more pipes leading from one of these points to the other without intermediate openings, so as to cause the water in the narrow space around the fire at the bottom to rise and continually flow upward and prevent sediment from accumulating in this space.

I am also aware that horizontal boilers have been set in brick-work having the usual side and end walls for inclosing the boiler, and in addition thereto cross partition-walls, upon which the boiler rests, said partition-walls dividing the chamber inclosing the boiler into three compartments, as shown in the patent of W. J. F. Liddell, January 30, 1883, and I make no claim to anything therein shown. Instead of dividing the chamber inclosing the boiler into compartments, I leave it in one chamber with the circulating-pipes, and form an arch, B'', between the upper end of the boiler, just above the central flues, and a lower point on the end wall, so that the products of combustion, instead of being allowed to rise from the flues, are turned downward and sent directly back under the circulating-pipes placed in the space below, and then up over the boiler itself.

What is claimed is—

A locomotive or fire-box boiler set in brick-work composed of the usual side and end walls, forming a chamber inclosing the entire boiler, with open space B' all around it, and having an arch, B'', between the end of the boiler just above the central flues and a lower

point on the end walls, such boiler having
one or more circulating-pipes, D, connecting
the water-space surrounding the bottom of the
fire-box with the water-space near the bottom
5 at the opposite end of the boiler, said pipe or
pipes passing under the boiler in the space
traversed by the products of combustion

emitted from the central flues, substantially
as and for the purpose specified.

LEON H. PRENTICE.

Witnesses:

JNO. H. WHIPPLE,
FRANK H. WOODCOCK.