

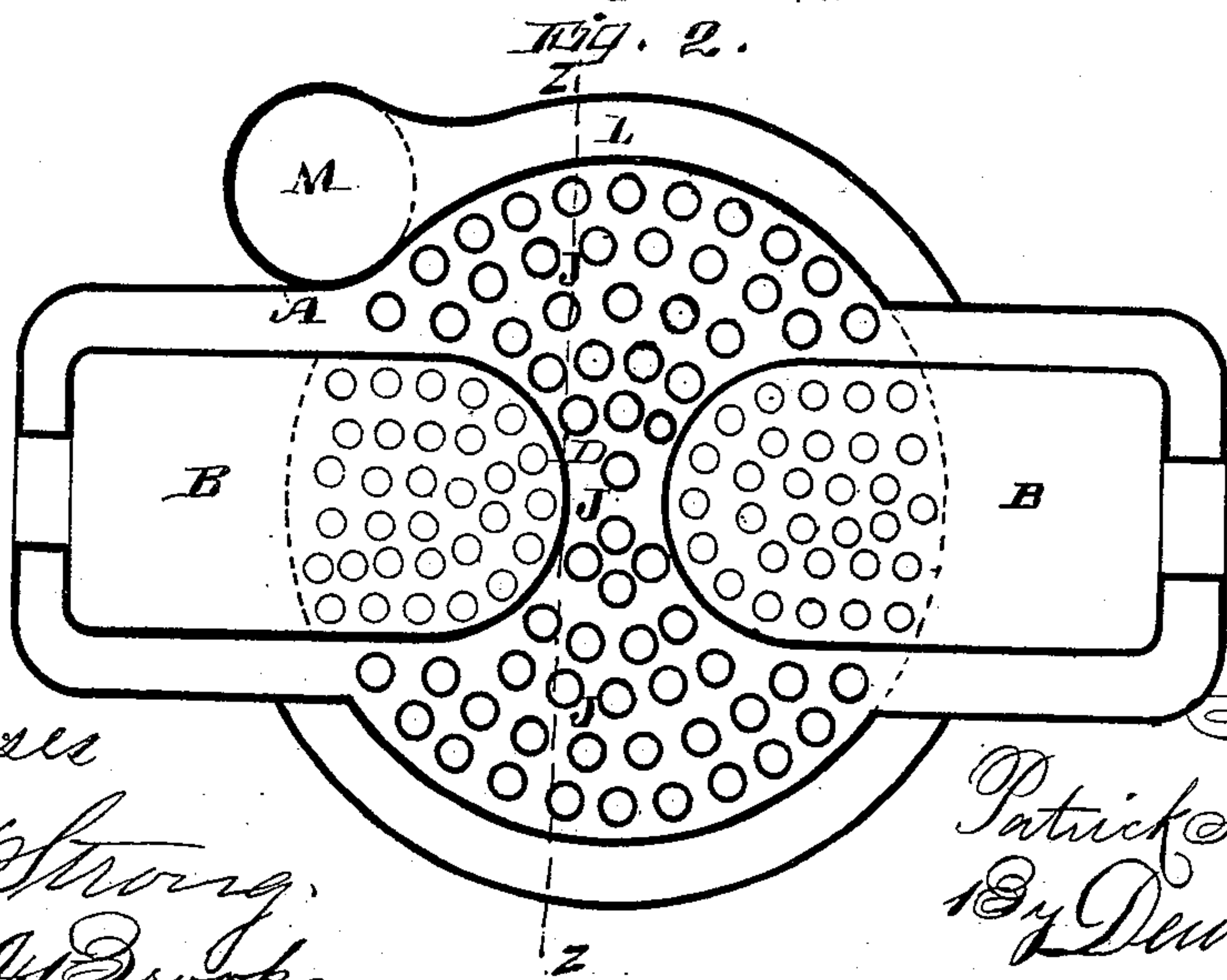
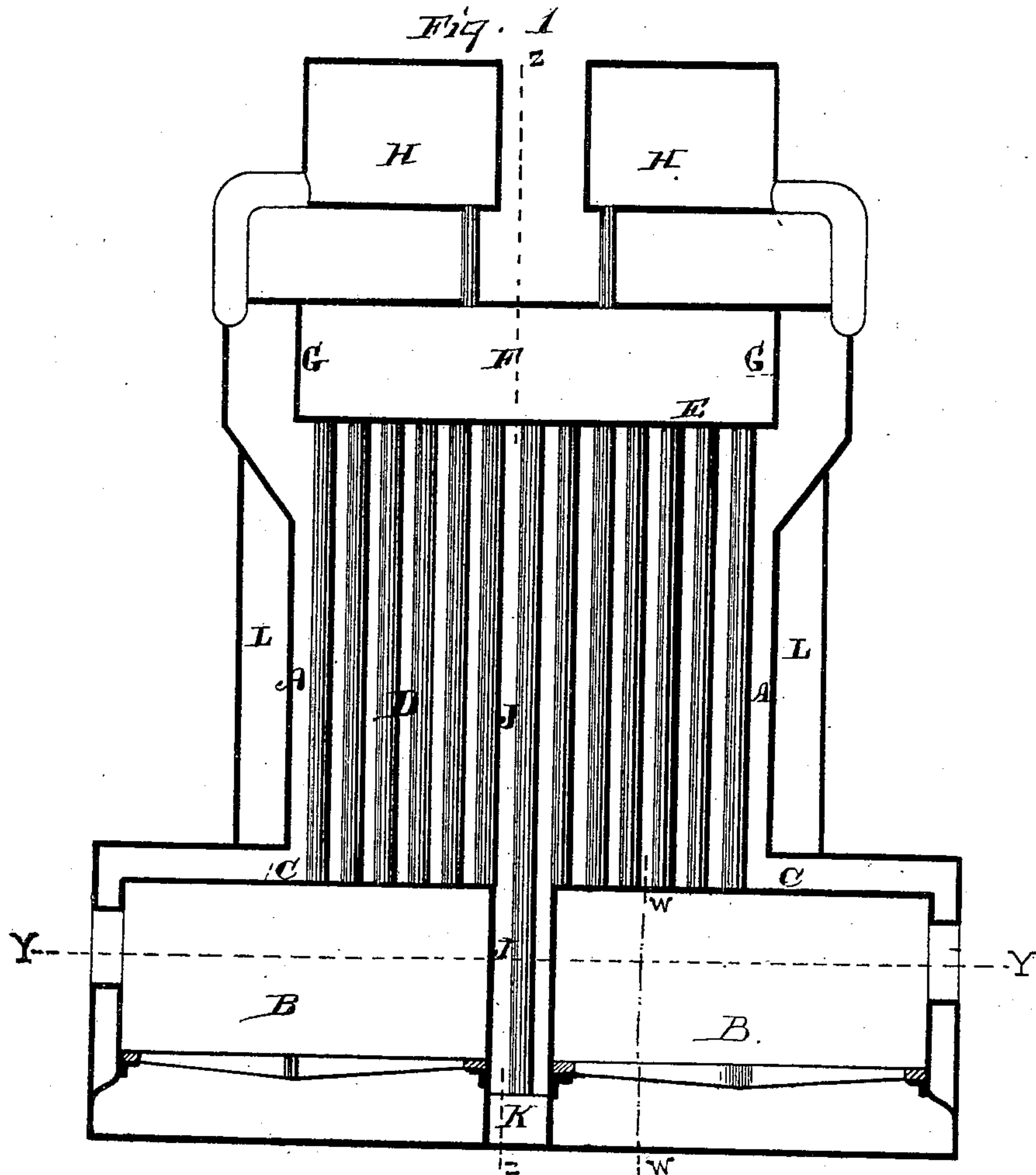
(Model.)

2 Sheets—Sheet 1.

P. F. DUNDON.
RETURN FLUE VERTICAL BOILER.

No. 267,407.

Patented Nov. 14, 1882.



Witnesses
Geo. H. Strong
Frank A. Brooks

Inventor
Patrick F. Dundon
By Dewey & Co
Attys

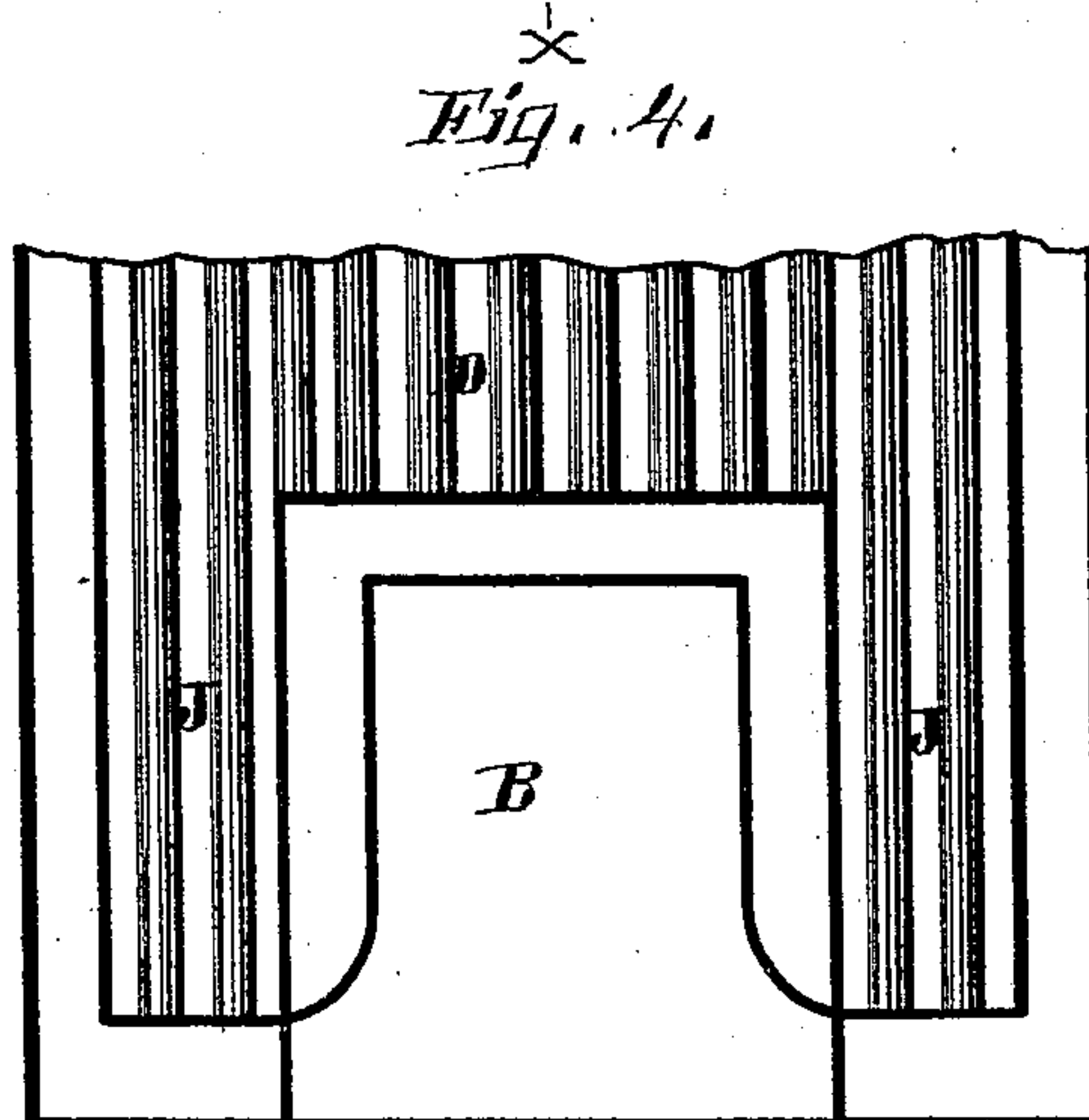
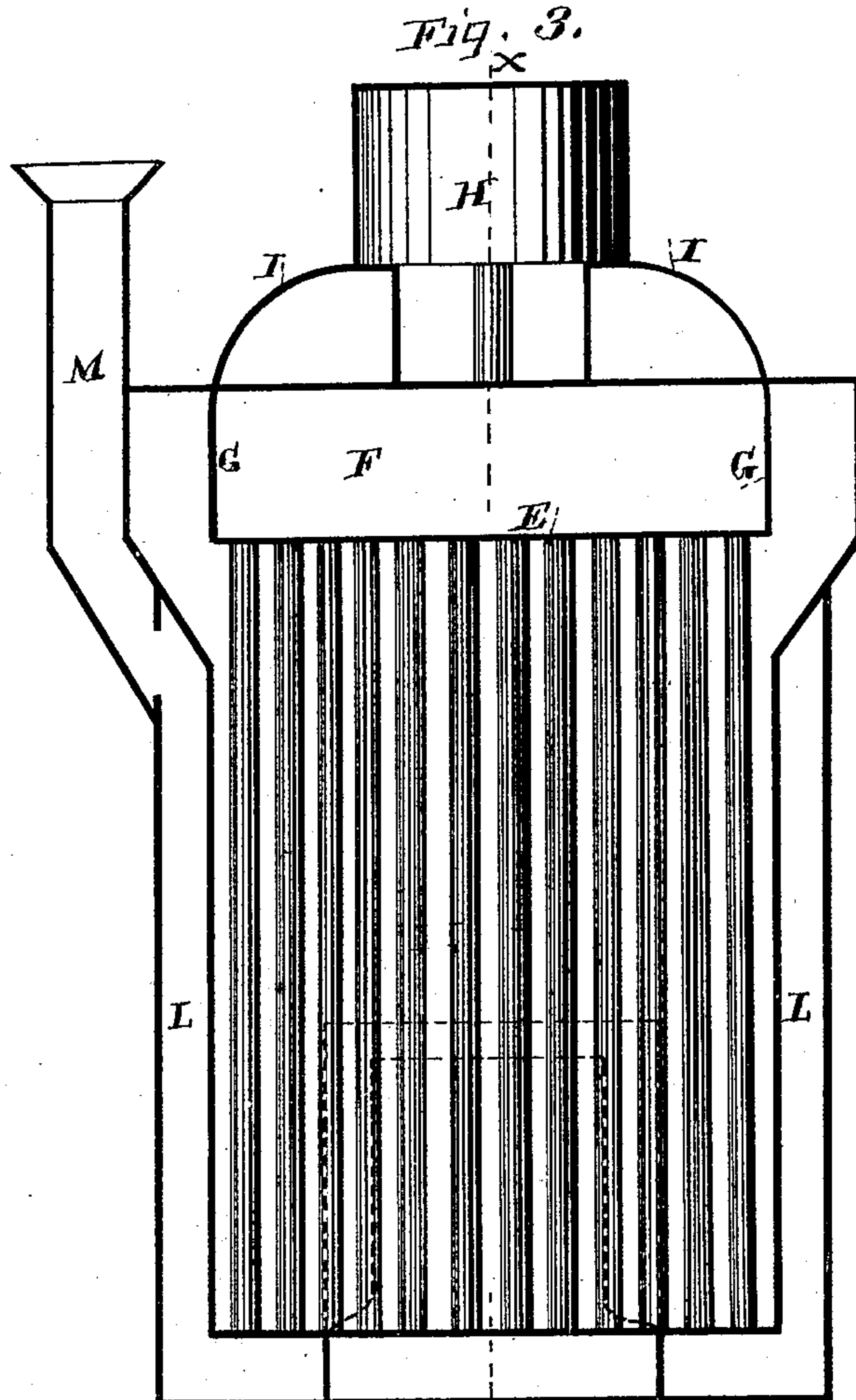
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UNITED STATES PATENT OFFICE.

PATRICK F. DUNDON, OF SAN FRANCISCO, CALIFORNIA.

RETURN-FLUE VERTICAL BOILER.

SPECIFICATION forming part of Letters Patent No. 267,407, dated November 14, 1882.

Application filed September 24, 1881. (Model.)

To all whom it may concern:

Be it known that I, PATRICK F. DUNDON, of the city and county of San Francisco, State of California, have invented a Return-Flue Vertical Boiler; and I hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to certain improvements in that class of steam-boilers known as "vertical" or "upright" boilers; and it consists in details of the construction and arrangement of parts, substantially as hereinafter more fully set forth and claimed.

In the construction are certain details, all of which will be more fully explained by referring to the accompanying drawings, in which—

Figure 1 is a vertical section of my boiler, taken through xx , Fig. 3. Fig. 2 is a horizontal section taken through yy , Figs. 1 or 3. Fig. 3 is a vertical section taken through ww , Fig. 1. Fig. 4 is a vertical section through the boiler on line zz of Fig. 2.

A is the shell of my boiler, which stands in a vertical position, and has one or more fire-boxes or furnaces, B, formed in the lower part and at the sides of the boiler-shell, as shown. A portion of the fire-box is rectangular in form and projects outside the shell of the boiler; but the inner or rear end is made semicircular where it passes within the curve of the shell of the boiler. If the boiler is of large diameter, two or four, or more, of these fire-places or furnaces may be formed around the shell, each extending a short distance toward the center, and this greatly increases the fuel and heating space. The crown-sheets C of each of these fire-places which lie within the circumference of the boiler-shell are perforated to receive the lower ends of the tubes D, which extend up through the upper flue-sheet or top, E, of the boiler and convey the flame and products of combustion from the furnaces to this point.

The exterior double shell G of the boiler extends upward above the head or flue-sheet E, and a top or casing, I, incloses the space between itself and the flue-sheet E, which is surrounded by the shell G so as to form a combustion-chamber, F, into which the products from the furnaces are led by the tubes D.

Other tubes, J, extend from the flue-sheet or

head E down through the central portion of the boiler parallel to the tubes D, and behind the fire-place or furnaces B to the lower head or flue-sheet, through which they open into a chamber, K, below. This chamber receives the products of combustion, which have thus passed through the water-space of the boiler twice, and from thence they are led into a casing, L, which surrounds the outer shell of the boiler and connects with the chimney or smoke-stack M; or the chimney may connect directly with the chamber K, if preferred.

Steam drums or superheaters are supported above the chamber F at the top of the boiler, and have pipes connecting them with the steam-space in the upper part of the cylindrical boiler-shell. In the present case I have shown these superheaters in the form of short vertical cylinders, the bases of which lie below the top plate, I, of the chamber F, and consequently within the chamber, so that the heat of the flame passing up through the tubes D will strike the bottom of these superheaters.

By this construction I provide a vertical boiler in which the water is subjected to the action of the heat passing through it from the furnaces in small tubes, and also in returning through it in similar tubes, while the steam within the drums H is exposed to the direct action of the heat as it arises from the furnaces.

I am aware that vertical boilers have been constructed having a large central fire-place or furnace extending nearly to the top of the boiler and opening into an annular chamber of larger diameter, from which small tubes descend through the space around the furnace to a chamber below, and I do not claim such a construction.

I am also aware that vertical boilers having centrally-located furnaces have been provided with short horizontal tubes connecting their upper portions with small tubes leading downward; but these furnaces are all located within the circumference of the shell of the boiler, and consequently but one furnace to a boiler could be used. In my invention the furnaces are partly exterior to the shell of the boiler, and they may therefore be multiplied as the size of the boiler is increased. The walls of the boiler extend above the upper tube-sheet,

thus allowing the tubes to be entirely submerged, and keeping the upper sheet, E, in contact with water, which reduces the heat, the consequent expansion and contraction, and liability to leakage. The fire passes through and around the water in the boiler three times before escaping, thus giving a large proportionate heating-surface. The steam passes into them at such a distance above the water-level that the water is not liable to foam or lift and the steam is thoroughly dried or superheated.

I am further aware that broadly it is not new to construct the inner or inclosed end of the furnace in a semicircular form.

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

1. In a vertical steam-boiler, the furnace or furnaces B, projecting outside the shell of the boiler, and having that portion within the line of the shell made semicircular, in combination with the flues D, leading up within the shell of the cylinder from the crown-sheet of the furnaces to an upper combustion-chamber at the top of the boiler, substantially as herein described.

2. In a vertical steam-boiler, the furnace or furnaces B, projecting outside the shell, and having their inner ends within the line of the shell and semicircular in form, the vertical tubes D, leading from the crown-sheets up with-

in the outer shell of the boiler to the upper combustion-chamber, F, in combination with the return-flues J, extending down behind and below the furnaces, and connecting the chamber F and the lower chamber, K, and the chimney, substantially as herein described.

3. The vertical boiler A, having the furnaces B partly exterior to the circumference of the shell, the vertical flues D, leading from the crown-sheets of the furnaces to the upper combustion-chamber, F, and the return-flues J, connecting the upper chamber, F, and the lower chamber, K, arranged below the furnaces, in combination with the exterior casing or shell, L, connecting the chamber K with the chimney, substantially as herein described.

4. The vertical boiler A, having the furnaces B partly exterior to the circumference of the shell, and the vertical tubes D, leading from the crown-sheets of the furnaces to the chamber F above the boiler, in combination with the steam drums or superheaters H, connected with the space within the main shell, and having their bases within the chamber F, and the cap or casing I, together with the tubes J, chamber K, exterior casing, L, and chimney, substantially as herein described.

In witness whereof I hereunto set my hand.
PATRICK F. DUNDON.

Witnesses:

FRANK A. BROOKS,
S. H. NOURSE.