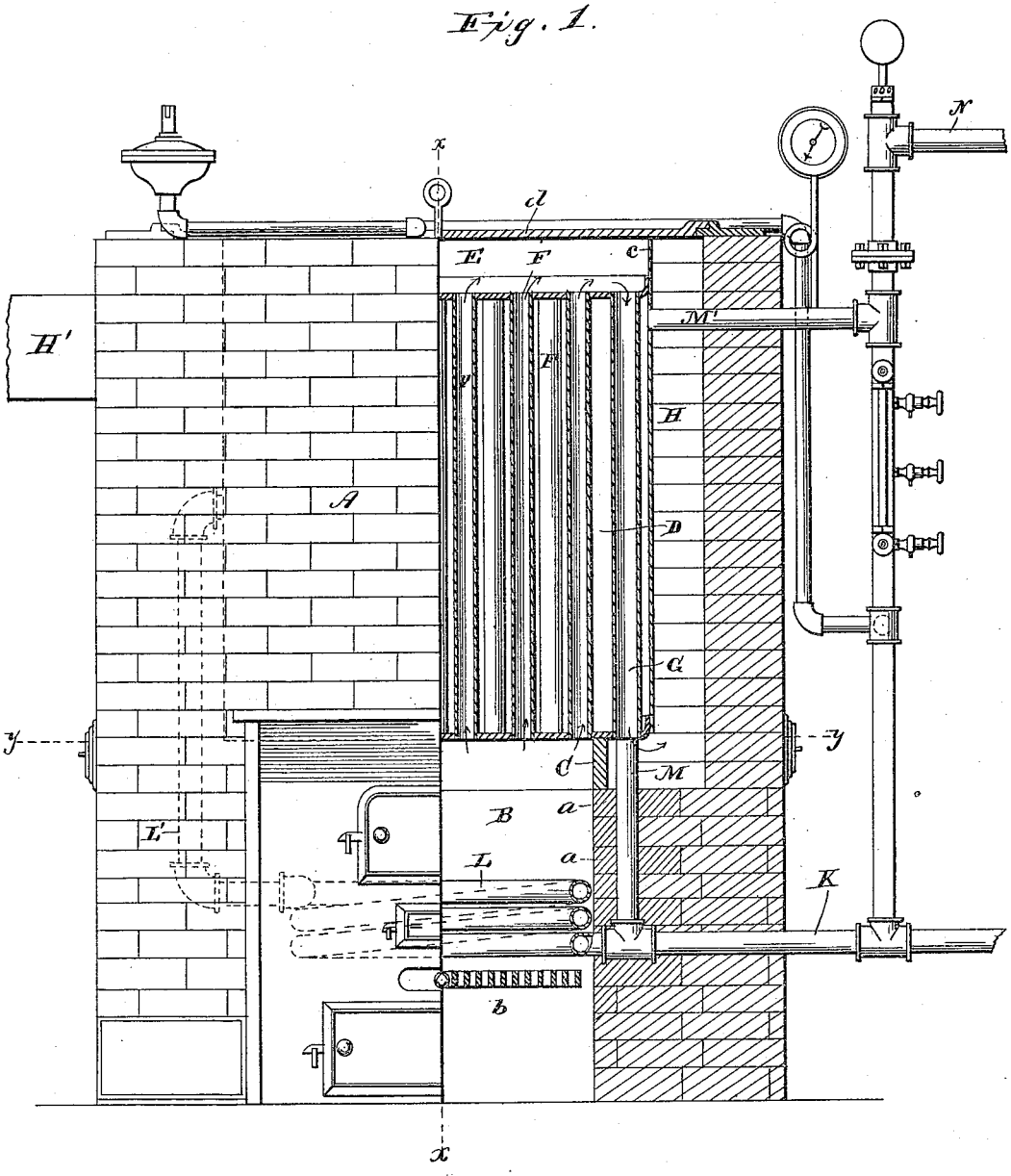
(No Model.) 2 Sheets—Sheet 1.

R. HARELL.

STEAM BOILER.

No. 348,007. Patented Aug. 24, 1886.

Fig. 1.



Witnesses.
Chas. R. Burr.
W. L. Jenaye

Inventor.
Richard Harell
by Franck D. Johns
his Attorney.

(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

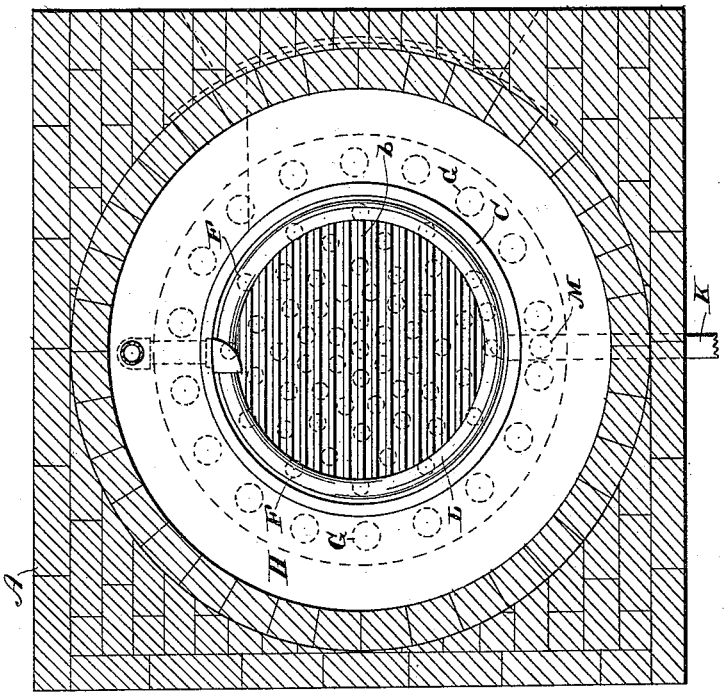
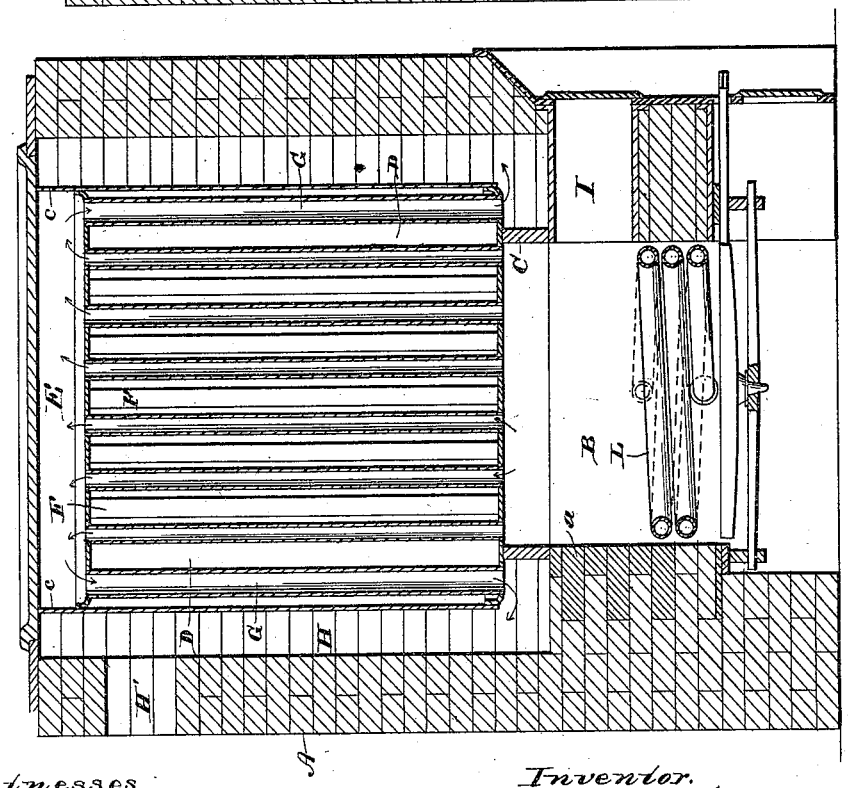


Fig. 2.



Witnesses.
Chas. R. Burk.
W. F. Wagner

Inventor.
Richard Harell
by Franck D. Johns
his Attorney.

UNITED STATES PATENT OFFICE.

RICHARD HARELL, OF DUNKIRK, NEW YORK, ASSIGNOR TO WILLIAM H. HARELL, OF SAME PLACE.

STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 348,007, dated August 24, 1886.

Application filed May 25, 1886. Serial No. 203,203. (No model.)

To all whom it may concern:

Be it known that I, RICHARD HARELL, a citizen of the United States, residing at Dunkirk, in the county of Chautauqua and State New York, have invented certain new and useful Improvements in Steam-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 appertains to make and use the same.

My invention relates to improvements in vertical tubular steam-boilers designed for heating purposes; and it consists in certain novel construction and arrangement of parts, all of which I will now proceed to point out and describe, reference being had to the accompanying drawings, in which—

Figure 1 is a front elevation, partly in section, of a boiler embodying my invention. Fig. 2 is a vertical section taken on line *x x* of and at right angles to the plane of Fig. 1, the upper portion of the boiler being broken away. Fig. 3 is a horizontal section taken on line *y y* of Fig. 1.

Referring to said drawings, A is a suitable setting of brick in which the boiler is mounted.

B is a circular fire-box and combustion-chamber lined with fire-brick *a*.

b is a suitable grate.

C is a metal ring, preferably of cast-iron, which rests on top of the fire-box.

D is a cylindrical vertical tubular boiler mounted on the ring C. The outer shell, *c*, is extended above the boiler, and is covered by a removable plate or cap, *d*, forming a chamber, E, on top of said boiler.

F are the direct flues or tubes communicating directly with the combustion-chamber, and opening into the chamber E.

G are the indirect or return flues or tubes communicating at their upper ends with the chamber E and opening at their lower ends into the smoke-flue chamber H, formed between the outer shell of said boiler and the brick setting. Said smoke-flue chamber extends all around the boiler and communicates with the smoke-stack H′. It will thus be seen that the ring C separates the combustion-chamber from the flue-chamber, and that the return flues or tubes, being located in the portion of the boiler which projects over the ring C, are separated at their lower ends from the direct flues or tubes by said ring C.

I is a fuel-feed passage provided with a suitable door.

K is the feed-pipe, which enters the fire-box at a point near the grate, and communicates with a pipe-coil, L, which extends around the sides of the fire-box and communicates with the pipe L′, through which the boiler is supplied with water.

M is a pipe connecting the lower part of the boiler with the coil, by means of which a perfect circulation is maintained between the boiler and coil.

M′ is a return-pipe communicating with the supply-pipe. It will thus be seen that the condensation and feed water passes through the coil before it enters the boiler, thus adding greatly to the amount of heating-surface, and enabling a more uniform pressure of steam to be maintained. A further advantage of the coil is, that the fire-bricks are entirely protected from the burning fuel, and are practically rendered indestructible.

N is the steam-pipe leading to the heating apparatus.

My boiler is provided with the ordinary steam and water gages, &c., as shown in the drawings.

In operation the condensation and feed water enters the boiler after passing through the coil, as above described. The products of combustion pass up through the direct flues into the chamber E, and thence down through the return-tubes into the smoke-flue chamber. By removing the plate or cap *d* on top of the chamber E the flues can be easily reached for the purpose of cleaning, &c.

My boiler is simple in its construction, is very efficient in operation, and can be produced very cheaply.

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

In a boiler for generating steam, the combination of the fire-box and combustion-chamber B, provided with the pipe-coil L, connected with the feed-water pipe, the ring C, mounted on top of the fire-box, the vertical cylindrical tubular boiler D, connected with the coil

L by pipes L′ M, the chamber E on top of the boiler, the series of direct flues or tubes F, connecting the combustion-chamber with the chamber E, and the series of indirect or return flues or tubes connecting the chamber E with the smoke-flue chamber H, substantially as shown and described.

In testimony whereof I affix my signature in presence of two witnesses.

RICHARD HARELL.

Witnesses:
CHAS. C. ABELL,
T. T. DANFORTH.