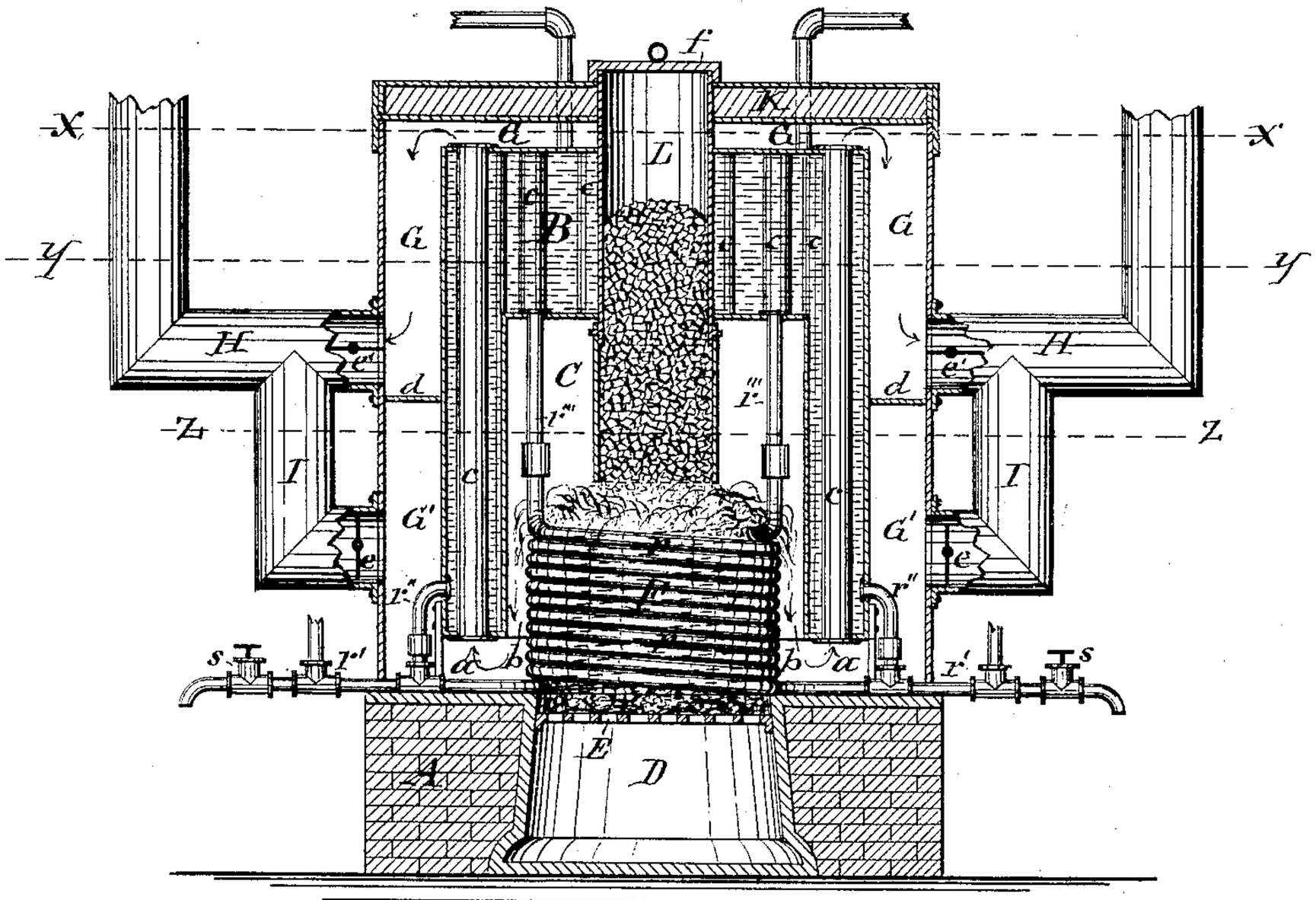
(No Model.) 2 Sheets—Sheet 1.

J. F. PEASE.

STEAM BOILER.

No. 332,748. Patented Dec. 22, 1885.

FIG-1-



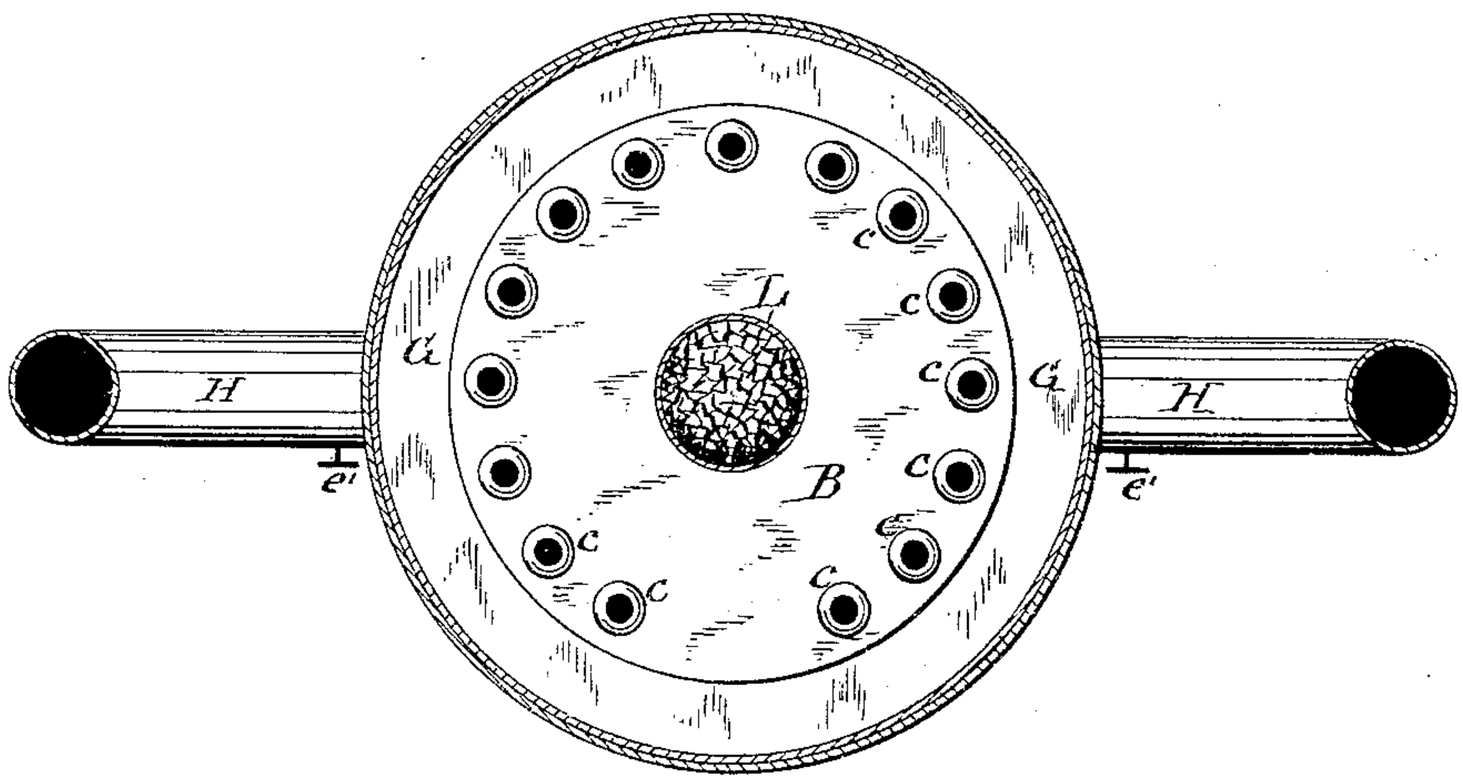


FIG-2-

ATTEST—

Chas. E. Raymond

C. Bendixon

INVENTOR—

John F. Pease

per Heald, Lacast & Hay

his Attys

(No Model.) 2 Sheets—Sheet 2.

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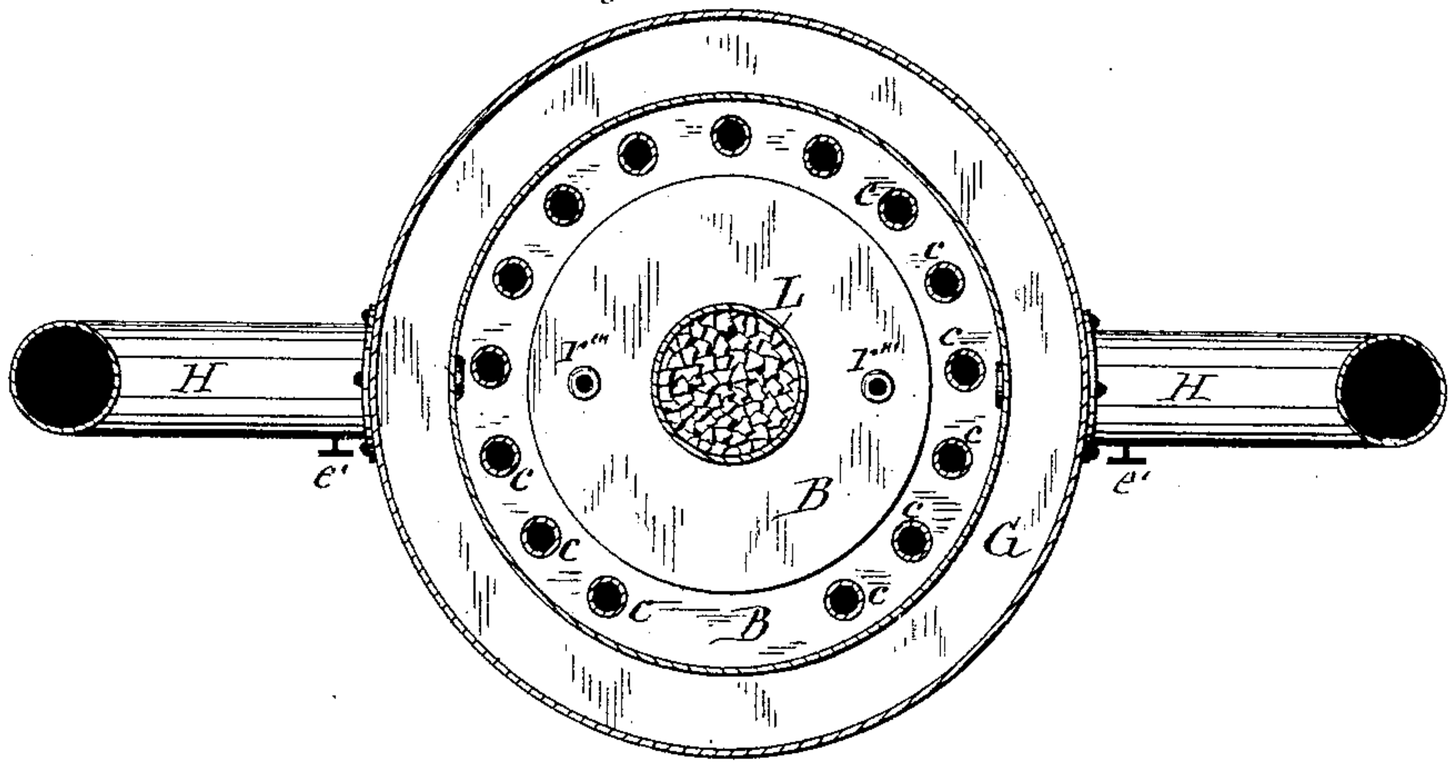

FIG-3-

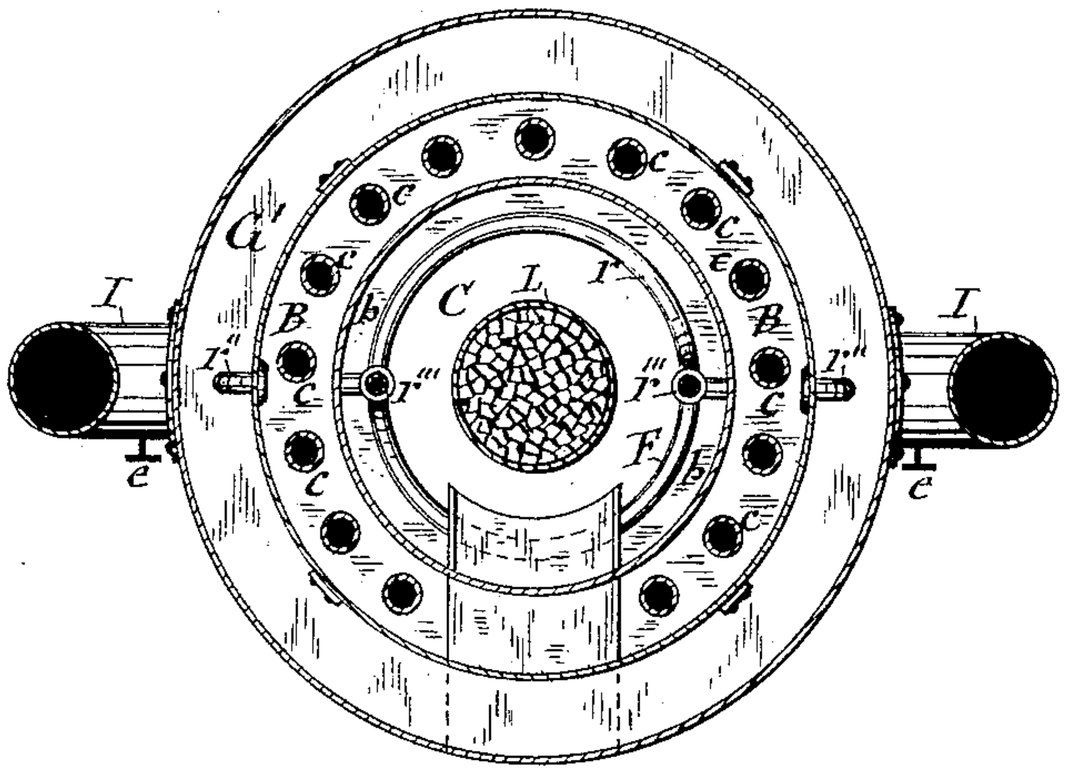

FIG-4-

ATTEST—

Wm. C. Raymond

C. Bendixon

INVENTOR—

John F. Pease

per Dell, Lacey & Hey

his Attys

UNITED STATES PATENT OFFICE.

JOHN F. PEASE, OF SYRACUSE, NEW YORK.

STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 332,748, dated December 22, 1885.

Application filed January 27, 1885. Serial No. 154,088. (No model.)

To all whom it may concern:

Be it known that I, JOHN F. PEASE, of Syracuse, in the county of Onondaga, in the State of New York, have invented new and useful Improvements in Steam-Boilers, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention has reference to the class of boilers designed for heating purposes; and it consists in a novel construction and combination of parts which cause the boiler to present maximum heating-surfaces in a most advantageous manner to the impingement of the products of combustion, and thereby render the boiler very efficient in its operation and comparatively very economical in the consumption of fuel.

The invention is fully illustrated in the annexed drawings, wherein Figure 1 is a vertical transverse section of the boiler, showing its connection with the fire-pot and surrounding smoke-boxes, and also the arrangement of the fuel-magazine; and Figs. 2, 3, and 4 are horizontal transverse sections, respectively, on lines *x x*, *y y*, and *z z* in Fig. 1.

Similar letters of reference indicate corresponding parts.

B represents an upright boiler mounted on a substantial base, A, built of brick or other suitable material. The boiler stands upon feet, which support it some distance above the base A, to form fire-passages *a a* under the boiler, as shown in Fig. 1 of the drawings.

C is a combustion-chamber formed concentric in the boiler, and extended vertically from the bottom part way the height of the boiler, and around said combustion-chamber are flues *c c*, extending vertically through the boiler. Under the combustion-chamber is the ash-pit D, set in the base A. A suitable grate, E, is arranged at or near the top of the ash-pit, and over said grate is placed the fire-pot F, which extends into the combustion-chamber C, and is of such a diameter as to form a fire-passage, *b*, between the vertical sides of the fire-pot and combustion-chamber, which fire-passage extends down to the bottom passage, *a*, hereinbefore described. The boiler is completely inclosed within a case provided with a horizontal partition, *d*, which divides it into two separate and distinct compartments, G G′, constituting smoke-boxes, the lower of which communicates with the combustion-chamber C through the fire-passages *a b*, and the upper of said smoke-boxes extending across the top of the boiler and communicating with the upper end of the flues *c c*. Exit-pipes H H tap the upper smoke-box at diametrically-opposite points and at or near the base thereof, and ducts or flues I I are extended from the lower smoke-box to the exit-pipes. The ducts I are each provided with a damper, *e*, and in each exit-pipe H, between the intersection therewith of the ducts I and the smoke-box, is a damper, *e′*. By closing the damper of the duct I and opening that of the exit-pipe H, the products of combustion are caused to descend from the fire-pot through the passages *a* and *b*, then through the flues *c c* to the upper smoke-box, G, and thence escape through the exit-pipes H H, as represented by arrows in Fig. 1 of the drawings. It will be observed that by this arrangement the heat rising from the fire-pot is caused to impinge the top plate or crown-sheet of the combustion-chamber, and the products of combustion are conducted around all sides and over both ends of the boiler, and through the same and in the said tortuous course the water of the boiler effectually absorbs the heat from the products of combustion, so that but very little of the heat is lost through the exit-pipe.

When first starting the fire in the fire-pot, or whenever it is desired to increase the draft through the fire-pot, the dampers *e* of the ducts I can be opened, to allow the products of combustion to escape from the bottom of the combustion-chamber through the lower smoke-box, G′, and thence through the ducts I direct to the exit-pipes H.

In order to prevent outward radiation of heat from the top of the upper smoke-box, G, I provide the latter with an extra cover, K, of clay or asbestus or other suitable material inferior as a conductor of heat.

The fire-pot F, I form of two water-pipes, *r r*, coiled spirally in one and the same direction and equidistant from the center of the coil, and alternately one over the other, with the successive layers in contact with each other, so as to present a solid wall, as shown

in Fig. 1 of the drawings, the diameter of the coil being sufficiently smaller than the diameter of the combustion-chamber C to form between their vertical sides the fire-passage *b*, hereinbefore referred to. The lower end of each coil has connected to it one of the water-supply pipes *r'*, which is provided with a blow-off cock, *s*, through which to eject the sediments of the water in the boiler. The base of the coil water-pipes is made to communicate with the base of the boiler by pipes *r''*, extended from the pipes *r'* into the lower portion of the boiler. The top of the aforesaid coils terminate with vertical branch pipes *r'''*, which tap the boiler at the top of the combustion-chamber C, and consequently at points considerably higher than the attachments of the pipes *r''*. The heat from the fire inclosed in the coils drives the water up through the pipes *r'''* and into the boiler, while the cool and more dense water flows from the bottom of the boiler through the pipes *r''* and *r'* to the coils *r*, thus producing a circulation of water through the coils and boiler.

L denotes a fuel-magazine extending vertically through the center of the upper smoke-box, G, and upper portion of the boiler and into the combustion-chamber C, and provided on its upper end with a suitable cover, *f*, which is removable, to permit of introducing the fuel into said magazine. By the attachment of said magazine the firing of the boiler is rendered as convenient as that of an ordinrry magazine-stove, and variations of the temperature of the boiler are to a great extent obviated.

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

1. In combination with the upright boiler and the combustion-chamber extending into said boiler from the bottom thereof, as shown, a fire-pot composed of a coil of water-pipes arranged inside of the combustion-chamber, with a fire-passage between their vertical sides, flues extending vertically through the boiler from the bottom of the water-space surrounding the combustion-chamber, and a smoke-box over the top and sides of the boiler, all constructed and combined substantially in the manner specified and shown.

2. The combination, with an upright boiler, of the combustion-chamber extending vertically into the boiler from the bottom thereof, the fire-pot extending into the combustion-chamber, a fire-passage between the vertical sides of the combustion-chamber and boiler and under the latter, vertical flues extending through the boiler at the sides of the combustion-chamber, a smoke-box surrounding the upper part of the boiler and communicating with the upper ends of the flues, a smoke-box surrounding the lower portion of the boiler and communicating with the fire-passage at the bottom thereof, an exit-flue tapping one of the smoke-boxes, a duct extended from the other smoke-box to the exit-flue, and dampers in said flue and duct, substantially as described and shown.

3. The combination, with the upright boiler, of a combustion-chamber extending vertically into the boiler from the bottom thereof and concentric therewith, flues extended vertically through the boiler at the sides of a fire-pot arranged concentric with the bottom portion of the combustion-chamber, with a fire-passage between their vertical sides, smoke-boxes completely surrounding the boiler and extended across the top thereof, and communicating, respectively, with the base of the combustion-chamber and upper end of the flues, and a fuel-magazine extending vertically through the upper smoke-box and through the center of the boiler, all combined substantially in the manner specified and shown.

4. The combination of the upright boiler formed with the combustion-chamber extending vertically into the bottom of the boiler, a coil of water-pipe arranged concentric in the lower portion of the combustion-chamber, with a fire-passage between their vertical sides, the base of said coil communicating with the base of the boiler, and the top of the coil terminating with vertical branch pipes tapping the boiler at the top of the combustion-chamber, vertical flues extending through the boiler at the side of the combustion-chamber, smoke-boxes completely surrounding the boiler and communicating, respectively, with the upper ends of the flues and with the combustion-chamber at the bottom of the boiler, exit-pipes connected to one of the smoke-boxes, ducts extended from the other smoke-box to the exit-pipes, and dampers in said pipes and ducts, all combined to operate substantially as described and shown.

In testimony whereof I have hereunto signed my name and affixed my seal, in the presence of two attesting witnesses, at Syracuse, in the county of Onondaga, in the State of New York, this 23d day of January, 1885.

JOHN F. PEASE. [L. S.]

Witnesses:

FREDERICK H. GIBBS,

CHARLES E. BURKE.