(No Model.)

2 Sheets—Sheet 1.

B. J. COLLER.

BOILER.

No. 500,855. Patented July 4, 1893.

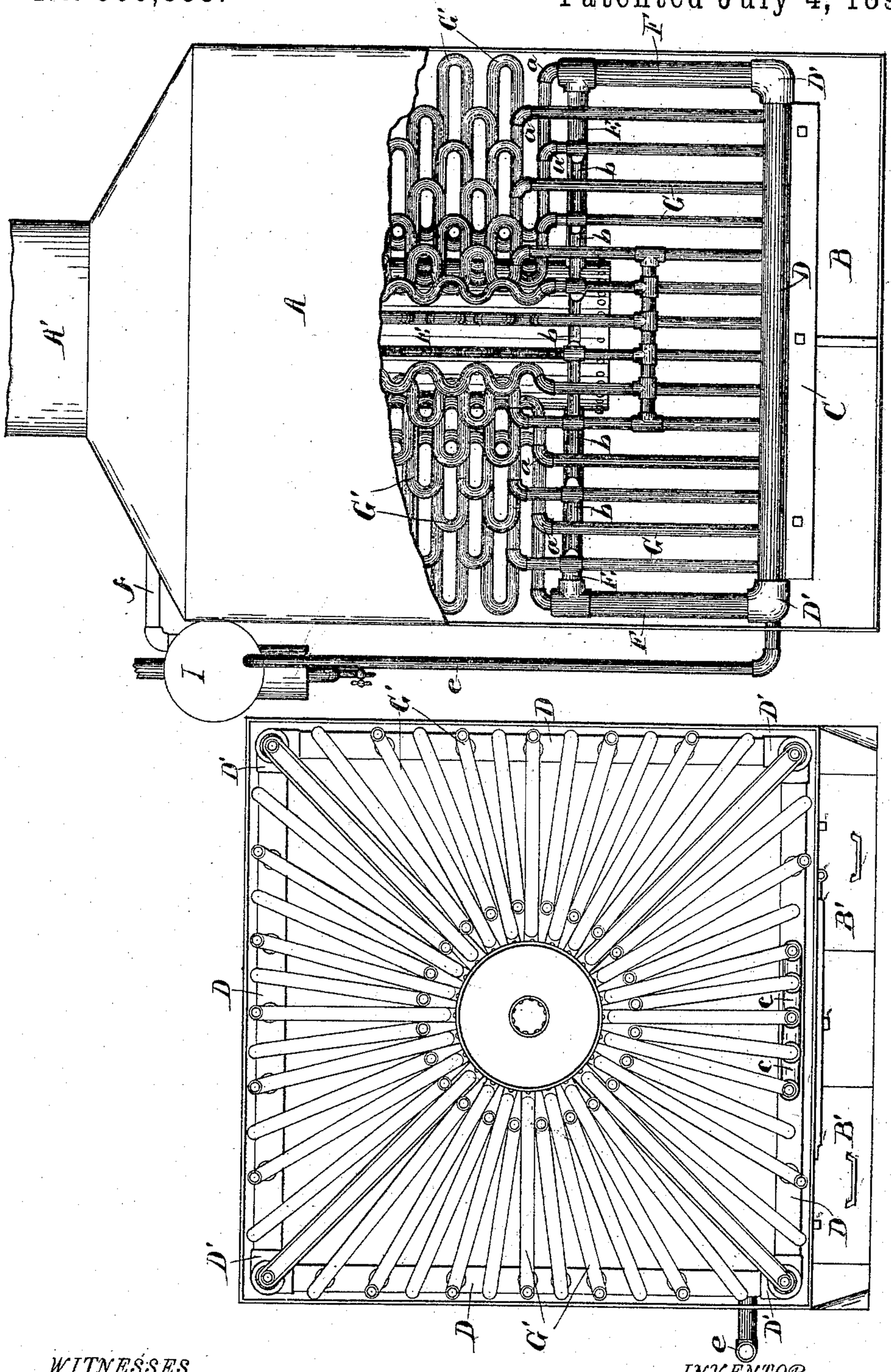

Fig. 1.

Fig. 2.

WITNESSES

O. B. Baumgardner.

C. K. Kramer.

INVENTOR

Barzillia J. Coller.

By R. B. Wheeler & Co.

Attorneys.

(No Model.) 2 Sheets—Sheet 2.

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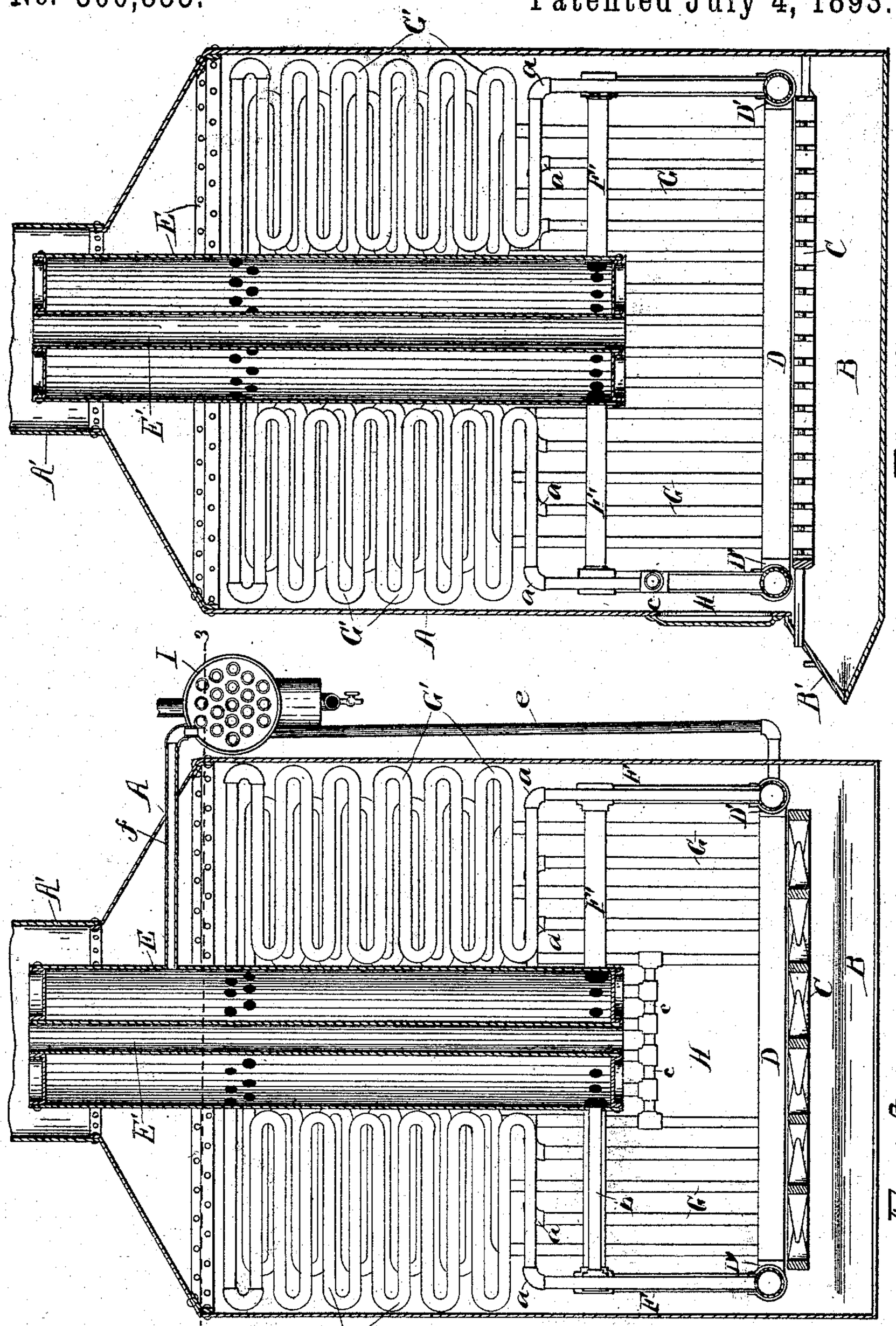

FIG. 4.

FIG. 3.

WITNESSES
O. W. Baumgardner.
C. K. Boerner.

INVENTOR
Barzillia J. Coller

By R. B. Wheeler & Co.
Attorneys.

UNITED STATES PATENT OFFICE.

BARZILLIA J. COLLER, OF DETROIT, MICHIGAN.

BOILER.

SPECIFICATION forming part of Letters Patent No. 500,855, dated July 4, 1893.

Application filed February 1, 1893. Serial No. 460,625. (No model.)

To all whom it may concern:

Be it known that I, BARZILLIA J. COLLER, a citizen of the United States, residing at Detroit, in the county of Wayne, State of Michigan, have invented certain new and useful Improvements in Boilers; and I do 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, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to new and useful improvements in boilers, and consists in the construction and arrangement of parts, as hereinafter fully set forth, the essential features of which being pointed out particularly in the claims.

The object of this invention is to produce a vertical boiler that is especially adapted for marine purposes, of simple and inexpensive construction, in which a great area of heating surface is provided, and a perfect circulation of water effected, and in which a very high steam pressure may be safely maintained, which object is attained by the construction illustrated in the accompanying drawings, in which—

Figure 1 is an elevation of my improved boiler, a portion of the sheeting being broken away showing the interior arrangement of parts. Fig. 2 is a horizontal section through the boiler. Fig. 3 is a vertical transverse section through the boiler and feeder. Fig. 4 is a vertical section through the boiler at right-angle to Fig. 3.

Referring to the letters of reference, A designates the exterior sheeting of the boiler, which converges at the top and is connected with the stack A′.

B designates the ash-pit provided with the inclined doors B′, and located above said pit is the grate C.

D designates a hollow quadrilateral base, formed of right-angle pipe sections, united at the corners by the couplings D′. This base extends around the grate just above its upper surface and is supported thereon. Supported centrally within the boiler, and some distance above the grate, is a drum E, which extends upward into the stack A′, and is provided with a central flue E′ passing vertically therethrough, that affords a passage for the caloric current through said drum.

Communicating with the hollow base D through the couplings D′ at the corners, are the large vertical pipes F that connect with the lower end of the drum E through the horizontal pipes F′, that extend radially from said drum.

G designates a series of straight vertical pipes, that communicate at their lower ends with the base D and extend entirely around the fire-space. The upper ends of these pipes G, are coupled by means of the elbows *a*, to the sinuous pipes G′ provided with return-bends, which cause said pipes to traverse the fire-space diametrically in radial order, and stand in vertical columns, their upper ends being expanded in the drum E, with the interior of which said pipes communicate. The lower end of each alternate pipe being connected with the base of said drum, through the horizontal radial pipes *b* more clearly shown in Fig. 1. It is designed that these sinuous and vertical pipes shall be compactly assembled, so as to afford the greatest possible area of heating surface.

The central vertical pipes G at the front of the boiler terminate some distance above the base D and their lower ends are connected by the transverse couplings *c*, thereby forming an opening H through said pipes, as clearly shown in Fig. 3, which serves as the stoke-hole of the furnace. By means of this arrangement of the central drum and the vertical and sinuous pipes located within the fire-space and connected with the upper and lower ends of said drum, a perfect and rapid circulation of the water is attained, obviating the condition of "dead-water" in any portion of the boiler. It will be apparent that the volume of water being divided into a number of small columns within the pipes G G′ and exposed directly to the heat within the fire-space, will become quickly and intensely heated, causing it to rapidly ascend in said pipes and discharge into the upper portion of the drum E. The volume of water in said drum being larger, does not attain as high a degree of heat as that within the smaller pipes; therefore the water in the drum flows downward and outward through the horizontal

pipes connected with its base to supply the upward flow in the pipes G G′, thereby maintaining a perfect circulation. The extreme upper end of the drum E serves as the steam dome, the steam forming therein above the water line, which is indicated by dotted line 3—3 in Fig. 3. As will be seen the upper end of this drum extends into the stack, and is surrounded by the intense heat of the fire-space, whereby the steam therein is maintained at a high state of expansion.

I designates a feed-water heater of any approved construction, which is adapted to be connected with the exhaust of the engine, not shown, and is located on a line with the water-line of the boiler, so that the water in the boiler and feeder will stand on the same level, the feeder being connected with the base of the boiler through the pipe *e* by which means the fluctuation of the water in the boiler is more perfectly controlled. And by means of the pipe *f* passing through the crown of the feeder and communicating with the steam-space in the drum E, the pressure in said feeder is equalized.

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

1. In a boiler, the combination of the hollow quadrilateral base, the vertical drum having the central flue therethrough located some distance above said base, the series of vertical pipes extending from said base, the horizontal radial pipes connecting the lower end of said drum and the upper end of said vertical pipes, the sinuous pipes surrounding said drum and connected therewith at their upper ends, their lower ends being connected with said vertical pipes, substantially as set forth.

2. In a boiler, the combination of the hollow quadrilateral base, the central vertical drum located some distance above said base, the vertical pipes extending from said base, the horizontal radial pipes connecting the lower end of said drum with said vertical pipes, the sinuous pipes surrounding said drum, said pipes being connected with the upper and lower ends of said drum and with the base through said vertical pipes, substantially as specified.

3. In a boiler, the combination of the exterior sheet inclosing the fire-space, the stack extending therefrom, the drum located centrally within said sheet and extending into said stack, the hollow base, the vertical and horizontal pipes connecting said drum and base, the sinuous pipes crossing the fire-space around said drum and connected with said drum at each end.

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

BARZILLIA J. COLLER.

Witnesses:
E. S. WHEELER,
E. K. ROEMER.