

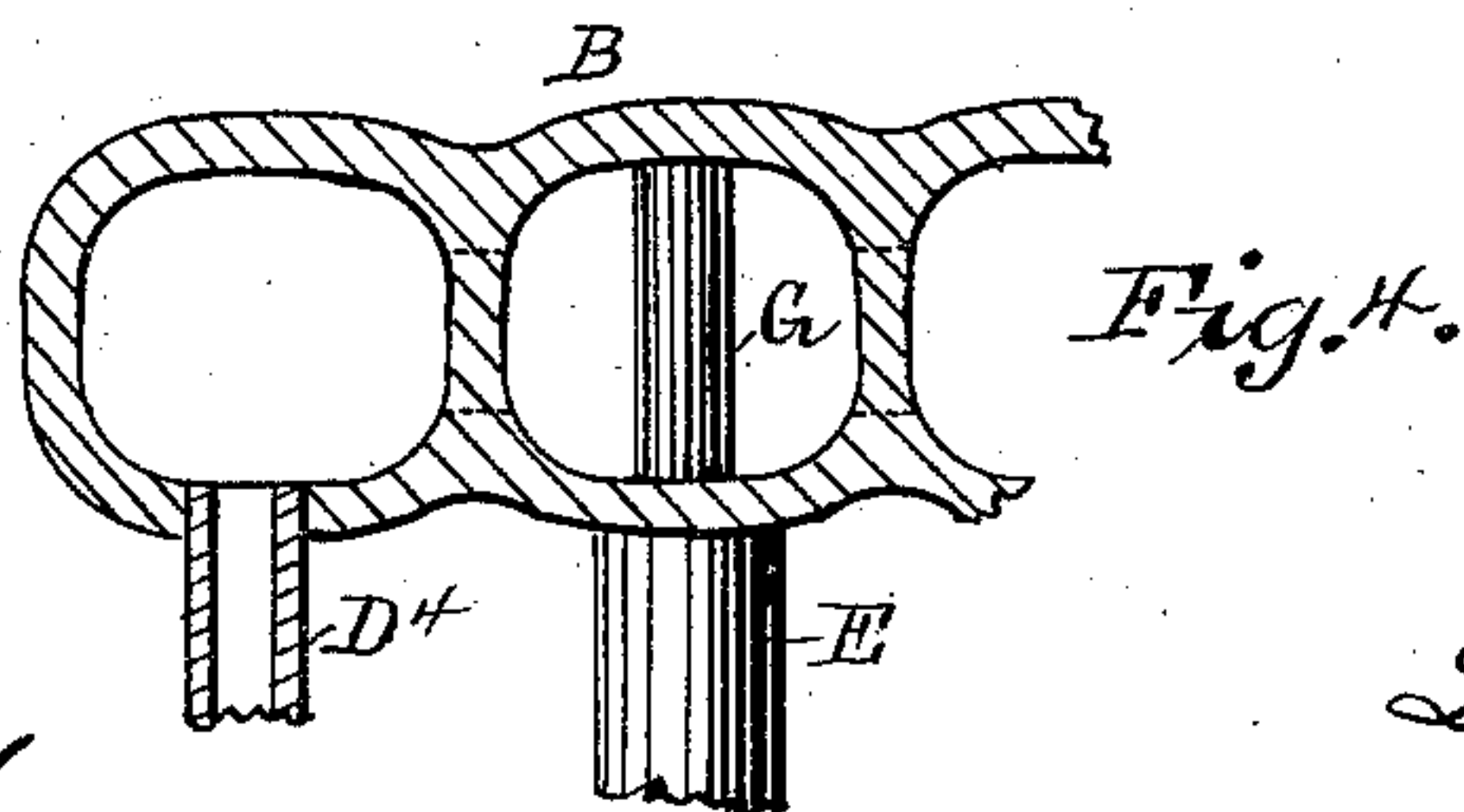
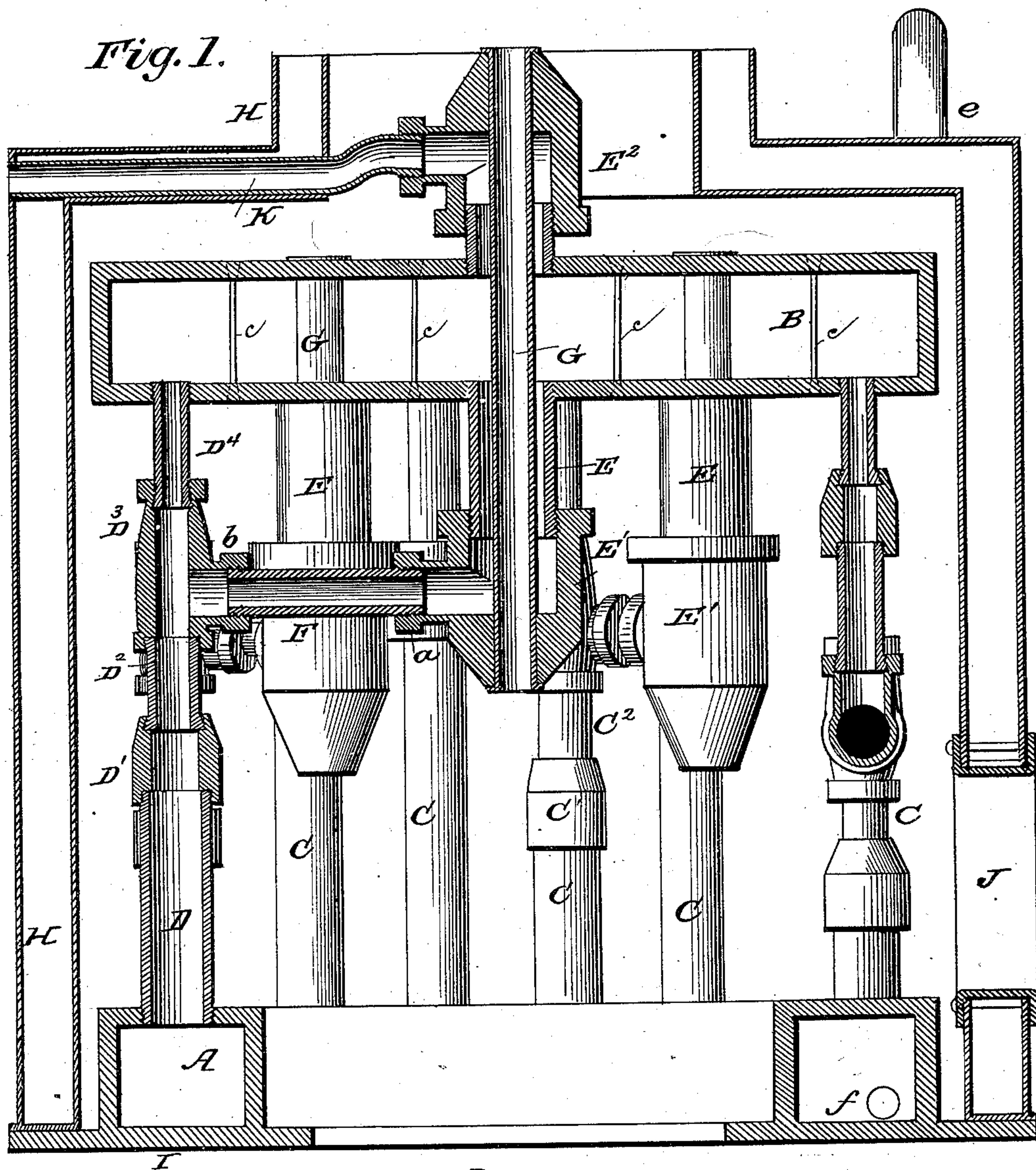
(No Model.)

2 Sheets—Sheet 1.

L. W. CHADWICK.
SECTIONAL STEAM BOILER.

No. 305,289.

Patented Sept. 16, 1884.



WITNESSES:

Edw. L. Dieterich
Edw. L. Byrnes

INVENTOR.

L. W. Chadwick
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ATTORNEYS.

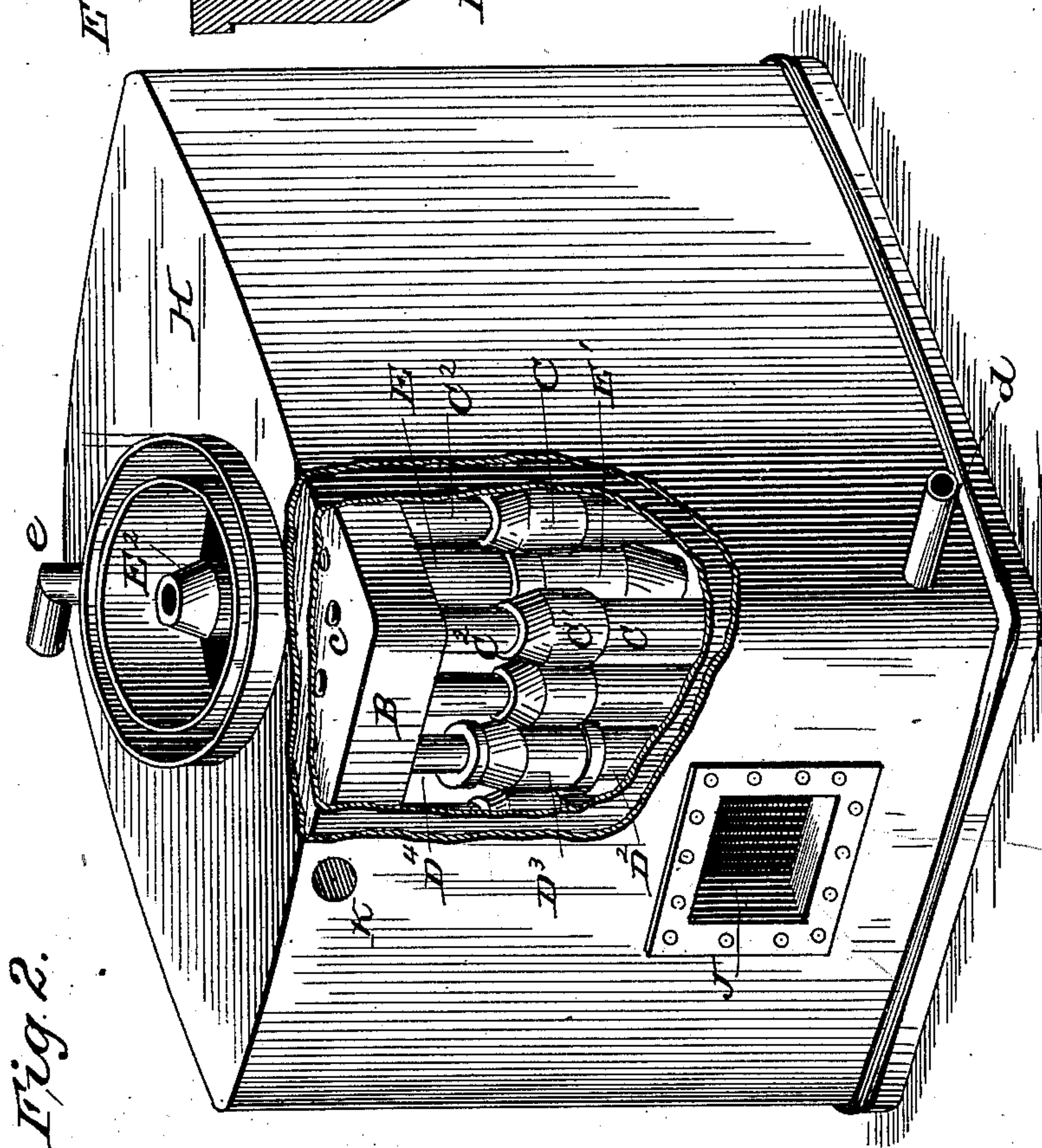
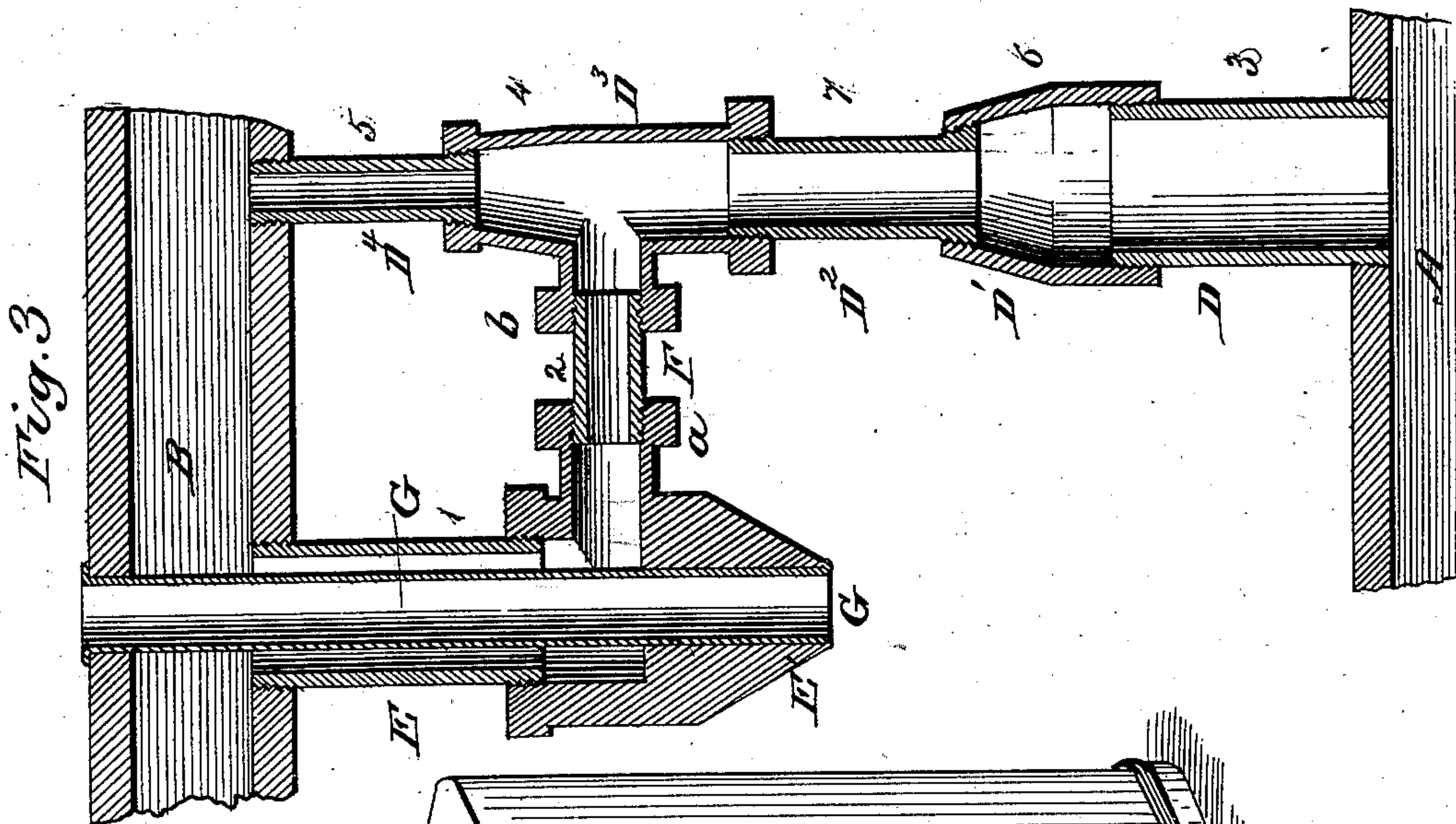
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UNITED STATES PATENT OFFICE.

LAWRENCE W. CHADWICK, OF MILNES, VIRGINIA.

SECTIONAL STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 305,289, dated September 16, 1884.

Application filed April 1, 1884. (No model.)

To all whom it may concern:

Be it known that I, LAWRENCE W. CHADWICK, a citizen of the United States, residing at Milnes, in the county of Page and State of Virginia, have invented certain new and useful Improvements in Sectional Steam-Boilers, of which the following is a description.

Figure 1 is a vertical central section. Fig. 2 is a perspective view with the corner of the hollow casing broken away. Fig. 3 is an enlarged sectional view showing the connection of the pipes between the upper and lower chambers, and Fig. 4 is a sectional detail showing a modification of the chamber B.

My invention relates to the sectional steam-boiler for which Letters Patent No. 249,585 were granted me November 15, 1881.

The improvement consists in the combination, with the vertical pipes of vertical pendent water-leg pipes depending from the upper chamber, and having a fire-flue through the same, and a lateral connection with the other vertical pipe. It also consists in the peculiar construction of the couplings, and in the means for obtaining dry steam, as hereinafter more fully described.

In the drawings, A represents a rectangular hollow water-chamber, made, preferably, of cast-iron, and having an opening in the center for the grate-bars. B is another hollow chamber at the top, and which is connected to the hollow chamber A below by a system of pipes, C and D. The pipes C are made up of large pipe C, reducer-coupling C', and small pipe C², which are substantially the same as those shown by me in my prior patent referred to. The other pipes, D, however, are made up of sections D D' D² D³ D⁴, and connect with the short pendent water-legs, composed of sections E E', by means of thimbles F. Each pipe D D', &c., is connected by a screw-joint to both the chamber A below and to the chamber B above. The pendent water-legs are composed of a pipe-section, E, screwed into chamber B, and a coupling, E', screwed onto the section E. This coupling E' has a lateral nipple, a, which, by means of pipe F, is coupled to a lateral nipple, b, on the reducer-coupling D³. Centrally through the water-legs E E' there passes a fire-flue or tube, G, which opens into the fire-space below, and passes through the steam-chamber B and

opens into the smoke-space above. These fire-flues may be expanded at their ends, so as to hold them in place; or they may be screwed into place, in either of which cases they act as stay-bolts. The water in this water-leg, it will be seen, occupies an annular or ring-shaped space, and is heated both from the inside and outside. It is supplied with water, which circulates through the thimble F from the vertical pipes D D', &c., and which prevents the deposition of any sediment in the bottoms of these water-legs.

In fitting these parts in place the order of their insertion is represented by the figures 1 to 6. Thus the water-leg E E' is first screwed into chamber B, and the thimble F is next screwed into the coupling a. The section D of the vertical pipe is then screwed into the bottom chamber, A. The reducer-coupling D³ is then screwed about a horizontal axis onto the coupling F. The small pipe D⁴ is then inserted into the bottom or big end of reducer D³ and allowed to protrude through its upper or small end, and is then turned so that the right-hand thread on its upper end screws into the chamber B, and at the same time the right-hand thread at its lower end screws into the upper end of reducer D³. Section D² and reducer D' are next to be applied. D² is then to be inserted into D' from the bottom and pushed up, while D' is screwed upon D below. Then the right-hand threads at the ends of D² are simultaneously screwed, the upper one into D³ and the lower one into D', which completes the connection of the parts, and makes a system of pipes that can be readily taken apart for repairs. At the front of the boiler the two vertical pipes C C, beside the door, are connected above the door by a T-coupling and screwed into the center of the upper chamber, B. There is a coupling, E², corresponding to E', below, and which coupling E² opens into the chamber B immediately above the central water-leg, E E', and the fire-flue G of this central water-leg extends up to the top of this upper coupling, E²; and said flue may be expanded at its end or fitted with a screw-joint, in either of which cases it also acts as a stay-bolt. To still further strengthen the chamber B, rows of stay-bolts c are employed between the upper and lower sides of the chamber B. When, however,

this chamber is made of cast-iron, the stay-bolts are dispensed with, and said chamber is cast with stiffening webs or diaphragms between its top and bottom sides, as in Fig. 4.

5 Around the sectional boiler as thus described is placed a hollow casing, H, which surrounds all four sides, and is simply set over the sectional boiler from the top and rests upon the base I, so as to be readily removed when it is

10 desired to inspect or repair the pipes. This hollow casing has a door, J, opening through the same, and water is fed to the same at the bottom through pipe *d*, and flows off at the top through pipe *e*, and in passing through

15 this case the water becomes heated, (forming a feed-water heater,) and the water is also purified of its calcareous impurities. The coupling E^2 rests in the smoke-space of the casing, and steam taken from said coupling passes

20 through pipe K to the engine, which pipe is extended through the walls of the feed-water heater. By locating the coupling E^2 on the smoke-space it will be seen that I get dry or superheated steam. The water, as it is heated

25 in the casing, is taken from pipe *e* by a pump (not shown) and fed into the sectional boiler at the point *f* below. This feed-water heater, it will be seen, does not depend upon the exhaust, and does not produce any back-lash, as

30 when the exhaust is delivered through a series of pipes to heat the feed-water.

The great advantages of this boiler are its cheap construction, great heating capacity, and economy of fuel.

Having thus described my invention, what I claim as new is—

1. A boiler consisting of a chamber above the fire-space, a chamber below it, water-legs depending into the fire-space from the upper chamber, and having each a fire-flue through it, and vertical pipes connecting the upper and lower chambers, and having a lateral connection with the lower end of the water-leg, as and for the purpose described.

2. The combination of water-leg $E E'$ and flue G, the sectional pipe $D D' D^2 D^3 D^4$, the horizontal coupling-pipe F, and the chambers A and B, substantially as shown and described.

3. The coupling E^2 , mounted upon the top of chamber B and within the smoke-space, in combination with the chamber B, the central water-leg, $E E'$, the tube G, and the steam-pipe K, as and for the purpose described.

The above specification of my invention signed by me in the presence of two subscribing witnesses.

L. W. CHADWICK.

Witnesses:

EDW. W. BYRN,
CHAS. A. PETTIT.