

No. 615,711.

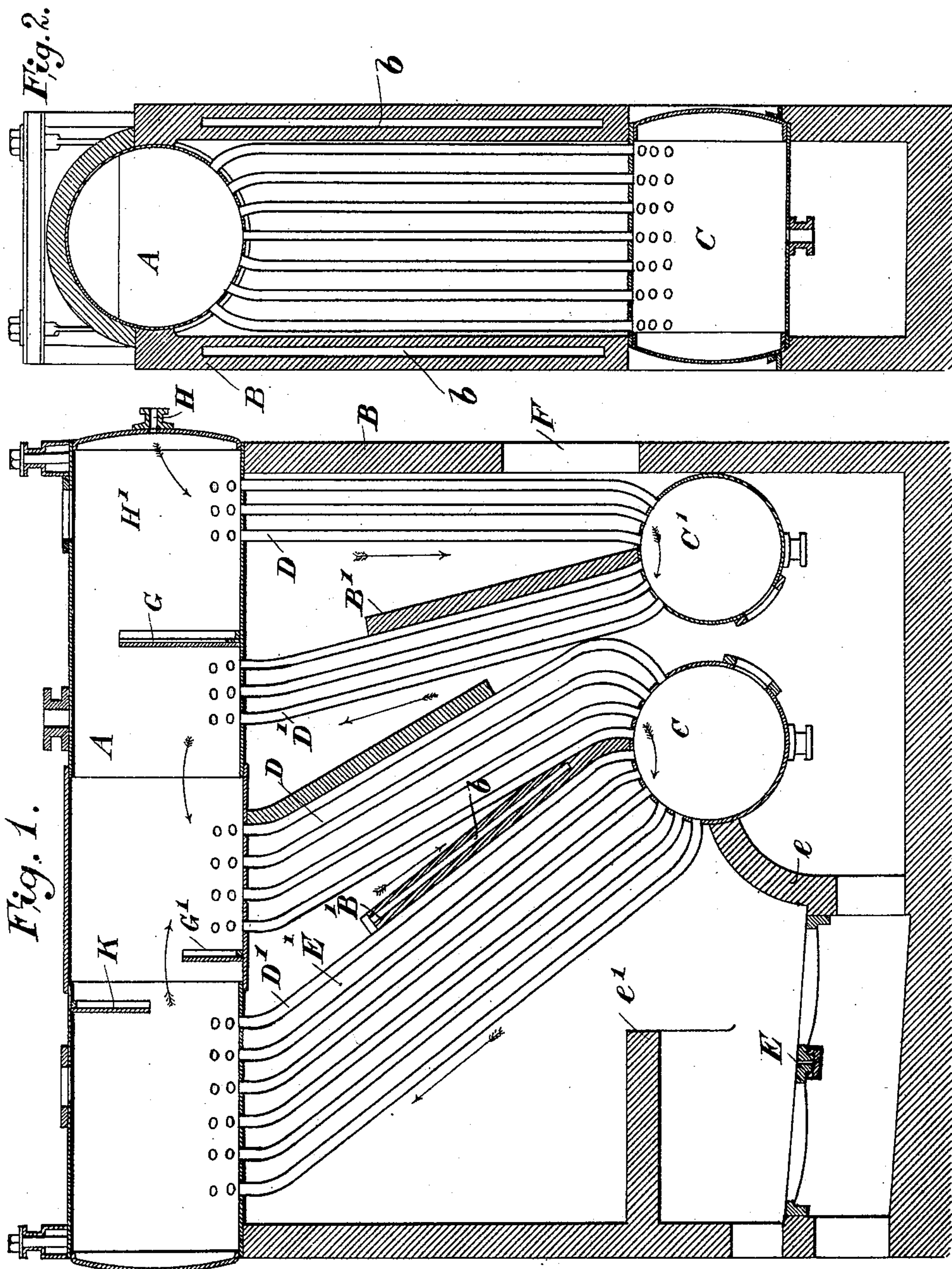
Patented Dec. 13, 1898.

J. JARDINE.
TUBULAR BOILER.

(Application filed May 10, 1897.)

(No Model.)

2 Sheets—Sheet 1.



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2 Sheets—Sheet 2.

Fig. 3.

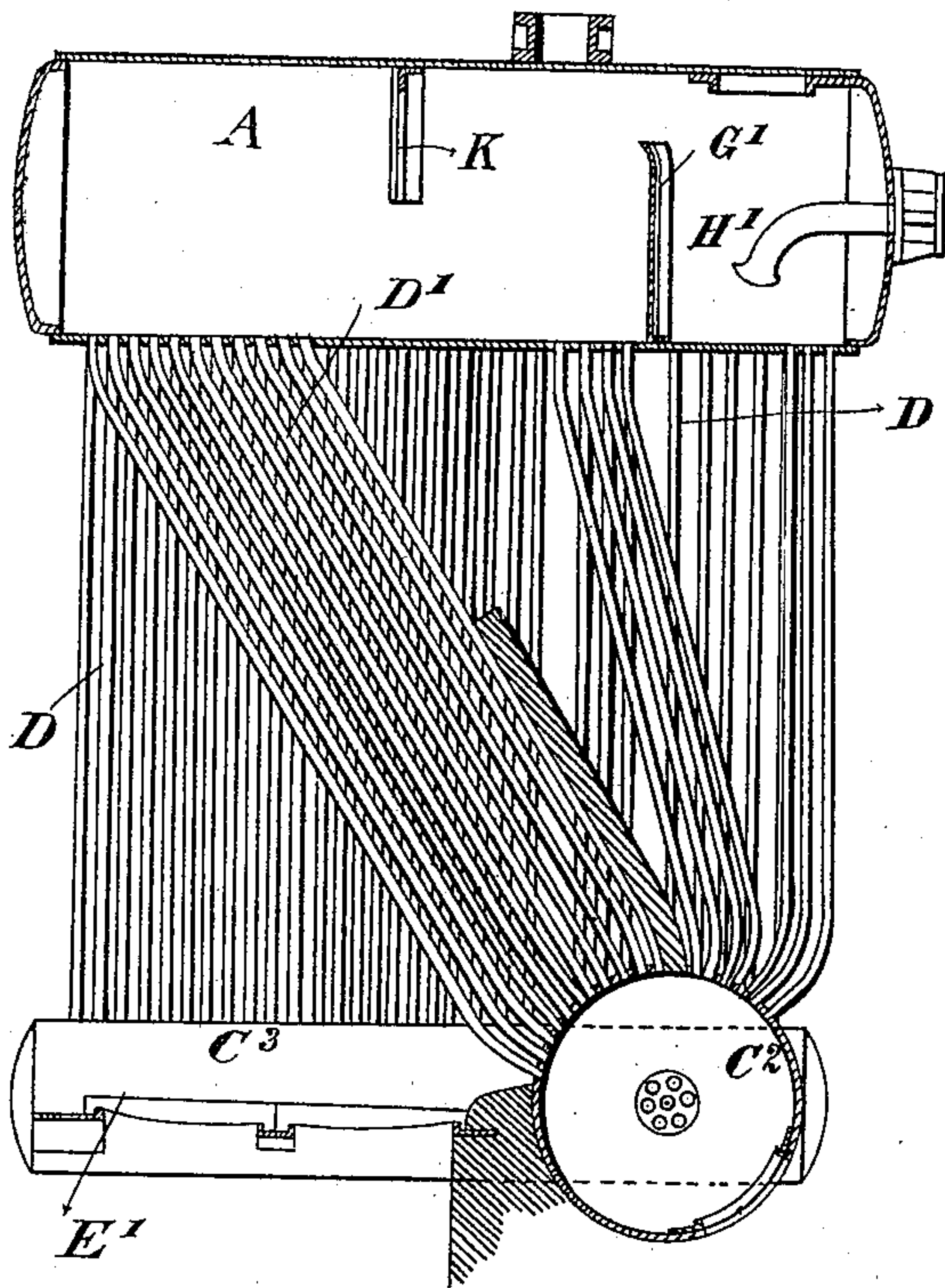
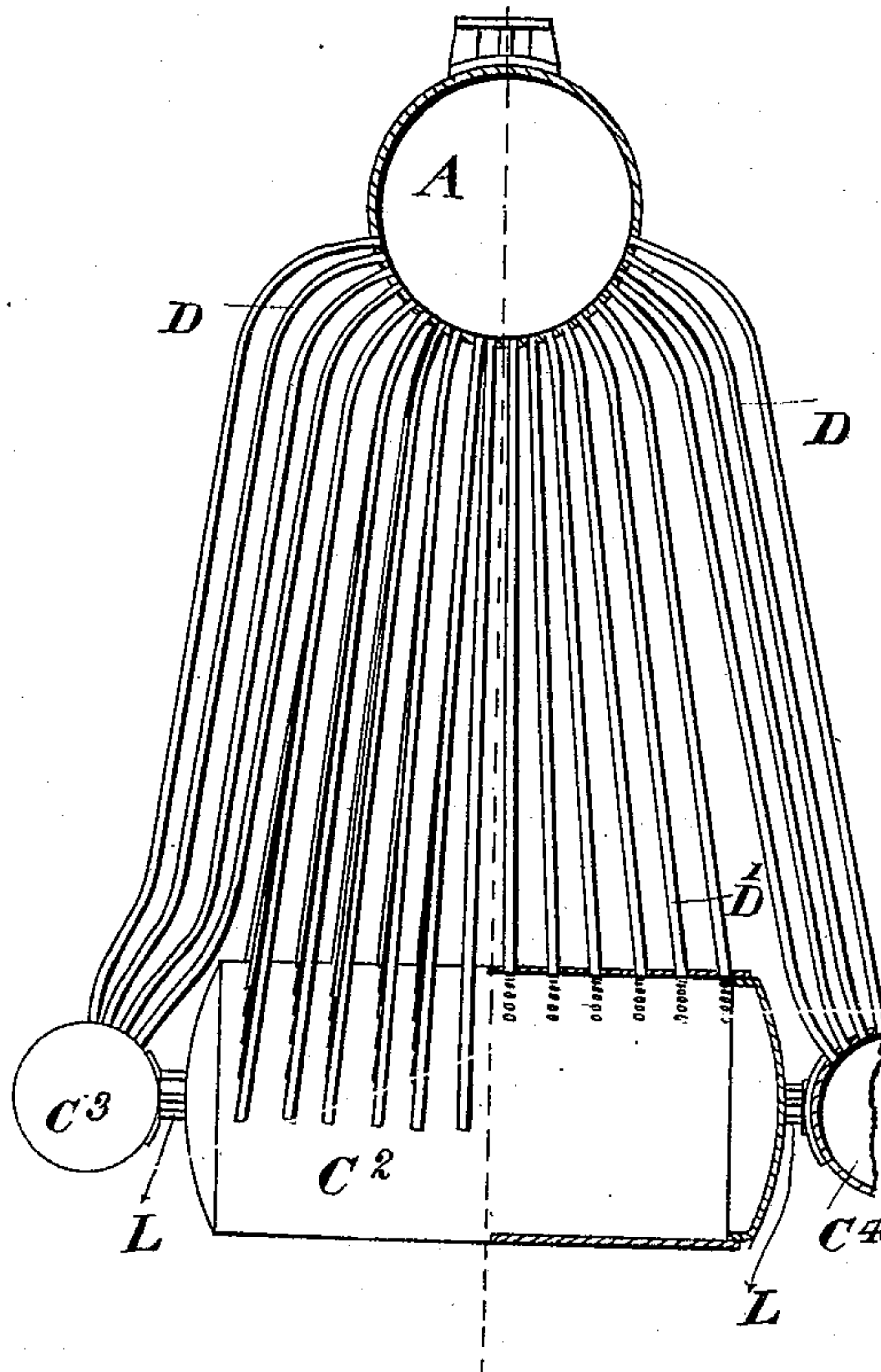


Fig. 4.



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UNITED STATES PATENT OFFICE.

JOHN JARDINE, OF MOTHERWELL, ENGLAND.

TUBULAR BOILER.

SPECIFICATION forming part of Letters Patent No. 615,711, dated December 13, 1898.

Application filed May 10, 1897. Serial No. 635,956. (No model.)

To all whom it may concern:

Be it known that I, JOHN JARDINE, engineer, a citizen of Great Britain, residing at Mayflower Cottage, Motherwell, in the county of Lanark, England, have invented certain new and useful Improvements in Tubulous Boilers, (for which I have obtained Letters Patent in Great Britain, No. 5,702, dated March 13, 1896, and in France, No. 257,305, dated June 17, 1896,) of which the following is a specification.

My invention has reference to improvements in connection with tubulous or water-tube boilers, the object being to arrange the steam-and-water drum overhead and the mud-drums below with the connecting-tubes in such a manner as to permit of easy examination and convenient cleaning or repairs and so as to occupy a minimum of space, while providing efficient circulation and a maximum generation of steam.

In the accompanying sheets of explanatory drawings, Figure 1 is a longitudinal sectional elevation, and Fig. 2 is a sectional end elevation, showing one form of my improved boilers suitable for land purposes. Figs. 3 and 4 are similar sectional views of another type of my improved form of construction suitable especially for marine purposes.

In carrying my invention into effect I arrange a boiler when intended for land purposes, as shown in Figs. 1 and 2, with a longitudinal steam-and-water drum A, placed at the upper end of the boiler B B and having beneath it two cross or transverse water-drums or water-and-mud drums C C', connected therewith by circulating small-diameter tubes D D', the furnace E being arranged, preferably, at the front end of the space E', beneath the upper steam-and-water drum A, and being provided with a fire-bridge *e* and inner flue-walls *e'* for directing the flame and heated gases between the tubes, so that they may pass in a circuitous manner from the furnace to the flue, uptake, or outlet F.

I arrange my upper steam-and-water drum A preferably with a baffle-plate or dividing screen or screens G near the inner end, so that when the feed-water, which I introduce into that end through the ordinary perforated supply-pipe connection H, is admitted

thereto it flows downward through the vertical connecting-tubes D to the transverse mud-drum C', lying underneath the longitudinal steam-and-water drum. I provide uptake-tubes D' from this mud-drum, so that the water may pass again or return to the upper main drum and that it may then flow through other downtake-tubes D, another dividing-screen G' being provided to facilitate positive circulation, as illustrated, the water thereby passing into the first water-drum C, lying at the rear end of the furnace-bars, and from this water-drum C, I also provide an uptake-battery of tubes D', connected to the main steam-and-water drum A above. Thus my main upper drum A is connected to the lower drums C C' by four ranges of tubes D D' D D', which serve to keep the water in complete and efficient circulation.

I may preferably arrange my steam-and-water drum, as also the mud-drum, with flat instead of circular surfaces or tube-plates to receive the tubes, the steam-and-water drum having such flat surfaces or tube-plates upon the under side, while the mud-drum is provided with such upon the upper side, the shape thereof being otherwise circular. I may also provide a baffle or division plate upon the transverse mud-drum to separate mud from the upgoing water.

I sometimes provide a perforated division-plate K in the upper drum A for assisting the flow of the currents of water therein and for insuring dry-steam collection.

By this arrangement of construction I am enabled to employ dirty or impure water and to trap the water and isolate the impurities, so as to confine all the mud and other precipitated matter in and near the rear mud-drum C', which mud-drum is in position convenient of access and can be readily cleaned and scaled, and its tubes can be readily examined or replaced.

I attach ordinary mountings to the upper main drum and fittings for taking all the steam to suit any desired requirement.

I provide air-spaces *b b* between the main-flue walls B B and baffle-plates B' to assist the heat-currents and to increase combustion. I also regulate the supply of air to the air-spaces by means of a baffle or other door placed in any convenient position.

When arranging my improved type of boiler for marine purposes, as shown in Figs. 3 and 4, I employ a horizontal upper steam-and-water drum A, as before described for my land-type boiler, and I arrange three lower drums C^2 C^3 C^4 in connection with this, having small circulating-tubes D D' passing from one to the other. The upper main drum A, I utilize as the steam-and-water drum and take the feed-water therein into the baffle-chamber H' at one end of the same, and I connect this upper drum, by means of a battery of small tubes D, to two longitudinal lower drums C^3 C^4 , disposed one on each side of the furnace-space E'. I also connect a transverse drum C^2 , which forms the end bar or bridge at the back of the furnace, to the upper drum by means of up and down take batteries of tubes D', so that the main upper drum is in connection with the three lower drums C^2 C^3 C^4 , and although I find it convenient to connect the three lower drums together by branches LL they need not necessarily be in connection one with the other. This is a form of boiler I may employ for water less dirty than would be used with the boiler shown in Figs. 1 and 2 and is also particularly useful for rapid steam-generation and for high pressures.

I provide division-plates K, as hereinbefore described, as antiprimers, and these insure dry steam, and I arrange any suitable mountings and fittings upon the various drums to suit any particular requirement.

In reference to the modification illustrated in Figs. 3 and 4, the flue or uptake to funnel may be arranged according to circumstances.

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

In combination, the upper drum extending from front to rear of the furnace, the transverse drum C^2 behind the fire-box, the tubes connecting the same with the upper drum, the independent drums C^3 , C^4 extending across the ends of the transverse drum and longitudinally of the furnace the tubes D connecting the upper drum with the side drums C^3 C^4 and the connections between the side drums and the transverse drum, substantially as described.

In witness whereof I have hereunto set my hand in presence of two witnesses.

JOHN JARDINE.

Witnesses:

ARCHIBALD JEFFREY,
JAMES GOUGH.