

No. 658,003.

Patented Sept. 18, 1900.

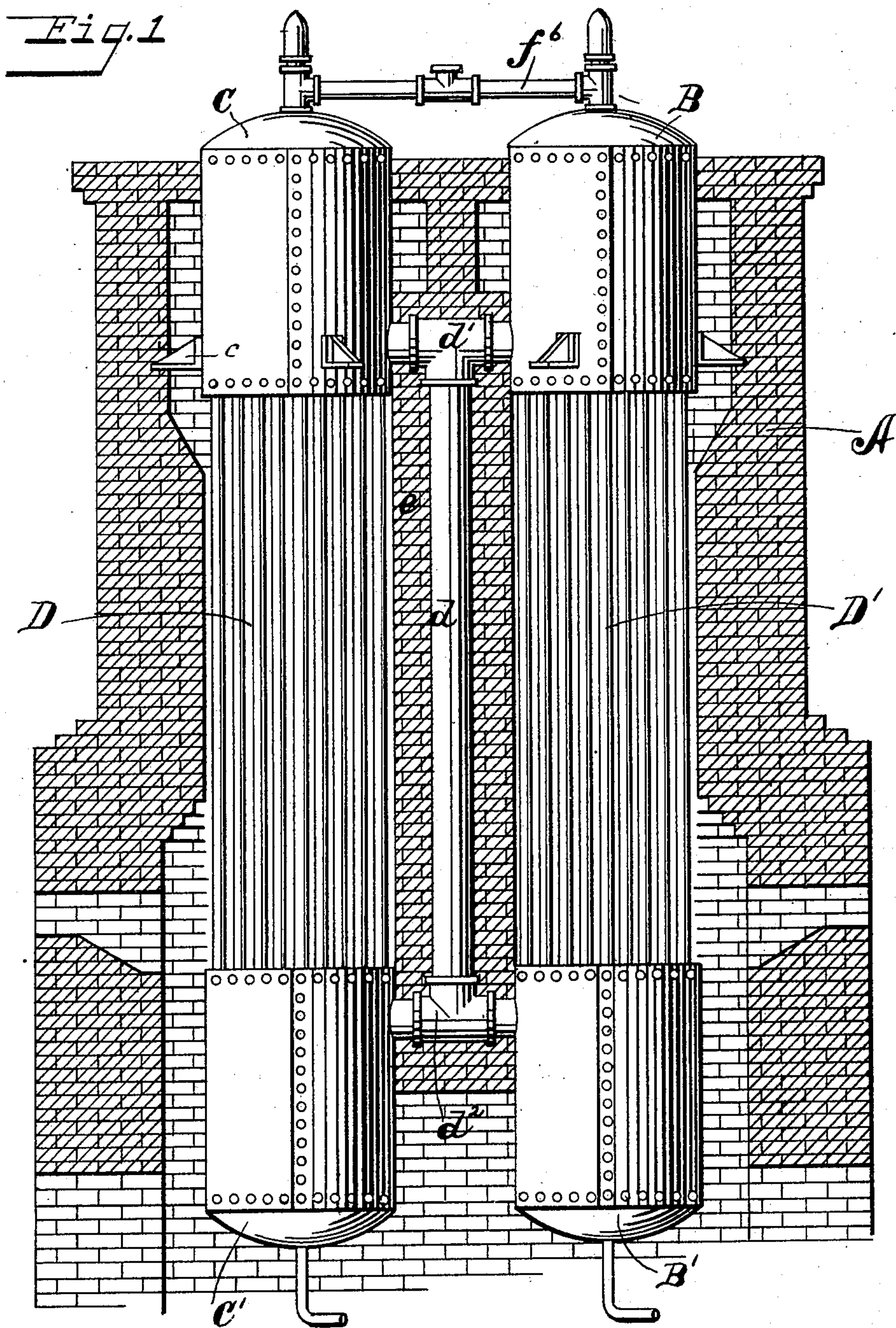
J. F. CASEY & M. M. HEDGES.

WATER TUBE BOILER.

(Application filed Feb. 17, 1899.)

(No Model.)

2 Sheets—Sheet 1.



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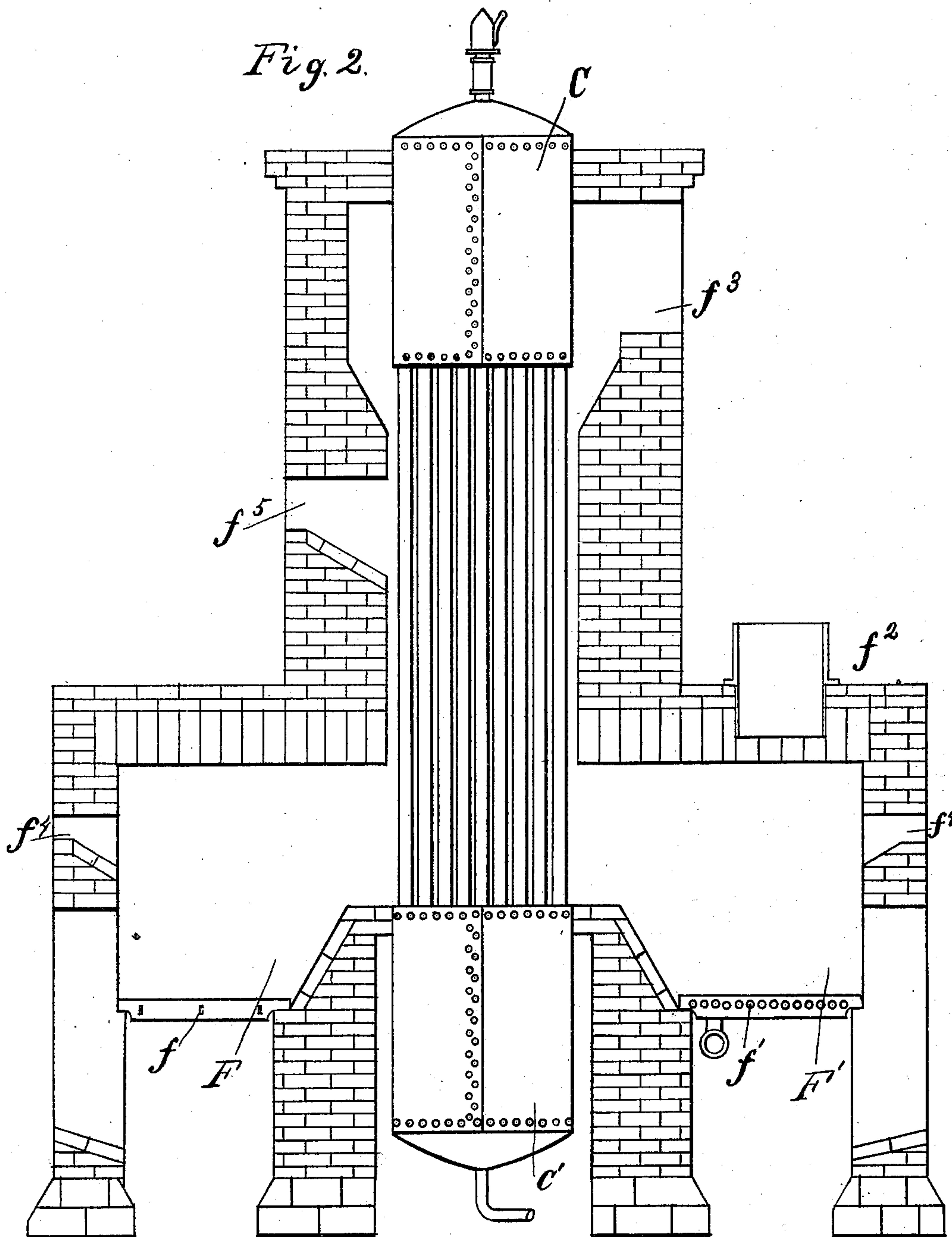
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2 Sheets—Sheet 2.



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UNITED STATES PATENT OFFICE.

JAMES F. CASEY AND MERTLAND M. HEDGES, OF CHATTANOOGA, TENNESSEE, ASSIGNORS TO THE CASEY & HEDGES MANUFACTURING COMPANY, OF SAME PLACE.

WATER-TUBE BOILER.

SPECIFICATION forming part of Letters Patent No. 658,003, dated September 18, 1900.

Application filed February 17, 1899. Serial No. 705,756. (No model.)

To all whom it may concern:

Be it known that we, JAMES F. CASEY and MERTLAND M. HEDGES, citizens of the United States, residing at Chattanooga, in the county of Hamilton and State of Tennessee, have invented certain new and useful Improvements in Water-Tube Boilers, of which the following is a specification.

Our invention relates to improvements in steam-boilers; and the object of our invention is to provide a steam-boiler formed of separate units so arranged and constructed that the heat products are utilized to the fullest extent and a perfect circulation of the boiler maintained, the construction of the boiler being extremely simple and readily adapted to the various uses for which it may be employed.

In the accompanying drawings, Figure 1 is a rear view of the boiler proper with the incasing walls in section, showing the arrangement of the units and their circulating connections. Fig. 2 is a sectional view through the furnace, showing the boiler in side elevation and installed in connection with a double furnace.

Like parts are represented by similar letters of reference in both views.

In the said drawings, A represents the outer casing, which may be of any suitable material, but preferably brick, built up in the usual manner for inclosing a boiler. The boiler proper consists of two units, each of which is made up of upper and lower drums B and B' and C and C', the upper drums B and C being connected to the lower drums B' and C' by series of vertical tubes D and D', which are adapted to preferably fill up or utilize all the available space of the bottom and top heads of the respective drums B and C and B' and C'. In constructing these units the upper heads of the upper drums and the lower heads of the lower drums are dished or crowning, the remaining heads of the drums where the tubes are attached being preferably straight, the tubes being connected to the said heads in the usual way. In forming the boiler from these respective units the units are mounted side by side and are connected together by T connections d' and d^2 , which T

connections are also connected together by a vertical pipe d . These connections d' and d^2 enter the respective drums B and C and B' and C' below the water-line, the upper drums being further connected by the steam-pipe f^6 , through which the steam is drawn. In order to insure the proper circulation, the respective units are separated by a bridge-wall, as shown at e , and which surrounds the pipe d . This bridge-wall serves the double purpose of confining the heat products to the nests of tubes D and D', and at the same time protecting the vertical circulating-pipe d from the heat products of the furnace. The respective boiler units are supported from the top drums B and C, as shown, by the supports b and c , which rest upon the incasing walls in the usual way.

As before stated, we have shown in Fig. 2 a double furnace, or, in fact, two furnaces F and F', one on each side of the boiler. This arrangement is preferably provided for localities in which bagasse or other waste products are utilized for steaming—as, for instance, in the sugar districts of the South. When this construction is used, the furnace F is arranged with the ordinary grate-bars f and is adapted for burning coal or similar fuel, while the furnace F' is provided with hollow-blast grate-bars—such, for instance, as described in our former patent, No. 579,955—and it is preferably further provided with an opening f^2 at the top of the furnace, through which the bagasse may be fed by the aid of a self-feeder, which is generally used with bagasse-furnaces. While this construction is considered a desirable one for bagasse and similar substances, it is by no means essential, as it is obvious that the boiler may be used with either of said furnaces alone.

The outer walls or casings are preferably provided with suitable openings or manholes f^4 and f^4 , arranged at proper intervals, so as to communicate to the boilers and that part of the boilers which extends above the furnaces, through which access may be had for cleaning the outer surfaces of the tubes.

In operation the products of combustion from either or both of the furnaces pass in the direction of the arrows in direct contact

with and surround the nests of tubes of the respective units, being forced to pass up through and around said tubes by the incasing walls and the bridge-wall, the lower drums of the respective units being preferably arranged below the line of the furnaces, or at least below that part of the furnace or furnaces which communicates with the tubes. The upper drum, however, is placed partly within the incasing walls, so that the heat products surround the lower part thereof and are discharged through the outlet f^3 into the stack or uptake at a point opposite the said drum.

By the arrangement thus described it will be seen that a very simple and economical boiler construction is secured; and this construction, in combination with the boiler-setting, produces a boiler in which the heat products are utilized to the fullest extent and a perfect circulation of the boiler insured. Inasmuch as the entire surface of the tubes as well as the principal portion of the drums are in direct communication with the heat products, the steaming capacity of the boiler is very great. The water is preferably fed to the lower drums, as indicated at g , and inasmuch as the lower drums are protected from the heat products by being below the furnace-line the feed-water will be gradually intermingled with the rapid circulation of the tubes and be perfectly assimilated.

Having thus described our invention, we claim—

1. A boiler such as described consisting of units, each of which is made up of upper and lower drums connected together by vertical tubes as described, and at the top near the bottom of the upper drums and at the bottom near the top of the lower drums by pipes carrying T connections, which T connections are connected by a circulating-pipe in combination with a furnace having a bridge-wall which surrounds said circulating-pipe, substantially as specified.

2. In a boiler such as described, the arrangement of the units each consisting of upper and lower drums connected together by tubes as described, and a central protected circulating-pipe of a larger body than the said tubes, the lower drums being placed below the furnace-line, substantially as and for the purpose specified.

3. The combination with the boiler consisting of two units each consisting of upper and lower drums connected together by vertical tubes, an outer casing surrounding said boilers, said casing being provided with a bridge-wall which separates said units and circulating-pipe connecting the upper and lower drums of said units protected by said bridge-wall, and a furnace extending across the respective units, substantially as described.

4. A boiler such as described, consisting of units, each of which is made up of upper and lower drums connected together by vertical tubes as described, and at the top near the bottom of the upper drums and bottom near the top of the lower drums by pipes carrying T connections, which T connections are connected by a circulating-pipe of larger body than said tubes, an outer casing for said boiler with the furnace extending across the respective units thereof, a bridge-wall extending throughout the height of the combustion-chamber of said furnace and inclosing said circulating-pipe throughout its entire length, outlets for said combustion-chambers near the top thereof, feed-water-supply inlets in the lower drums of said boiler and steam-outlets in the upper drums thereof, substantially as and for the purpose specified.

In testimony whereof we have hereunto set our hands this 10th day of February, A. D. 1899.

JAMES F. CASEY.

MERTLAND M. HEDGES.

Witnesses:

O. J. COPE,

S. D. BRADY.