

**No. 679,470.**

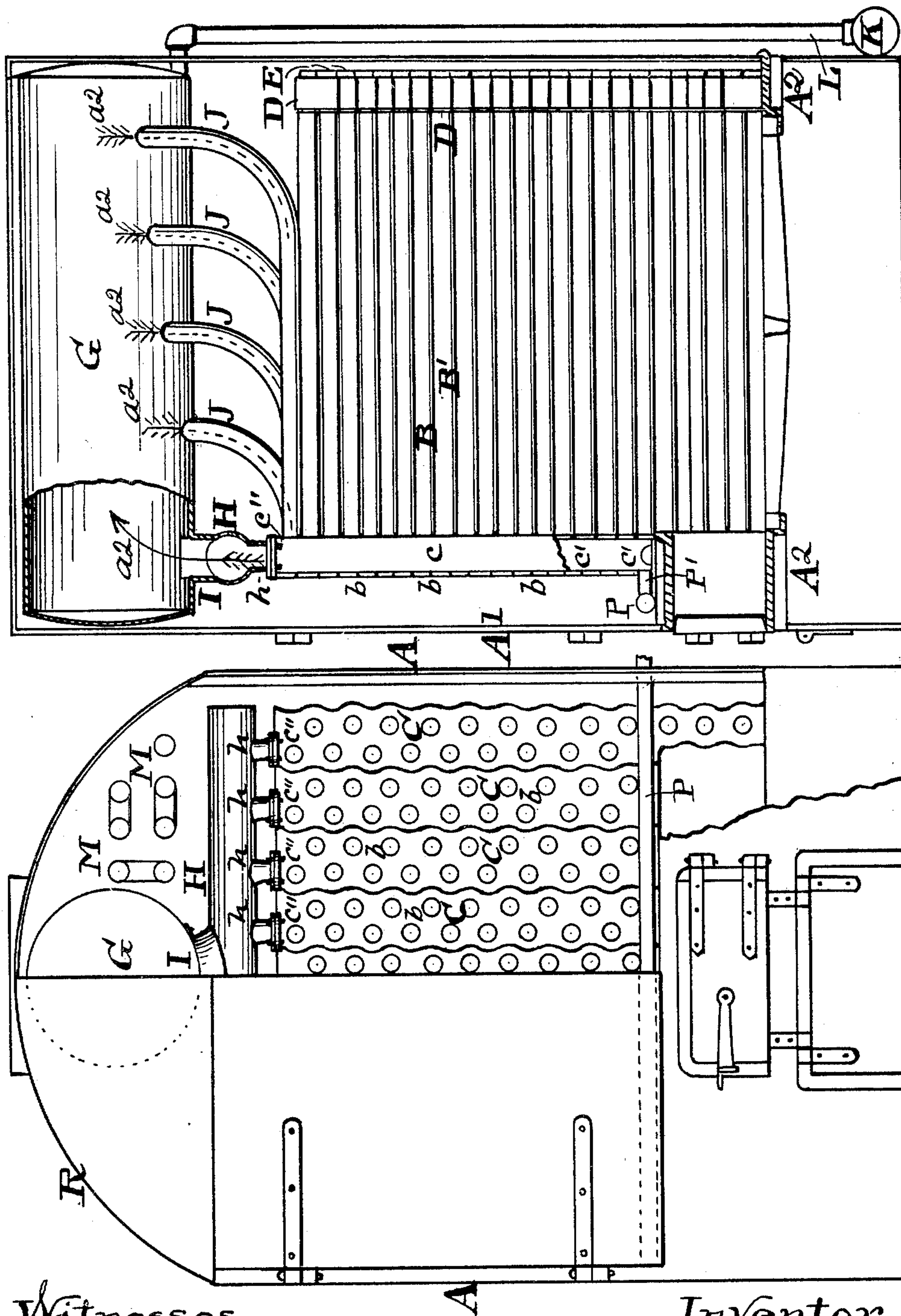
**Patented July 30, 1901.**

**G. S. WOLF.**  
**WATER TUBE BOILER.**

(Application filed Jan. 15, 1901.)

(No Model.)

**2 Sheets—Sheet 1.**



Witnesses.  
 Jesse A. Finner.  
 C. C. Young

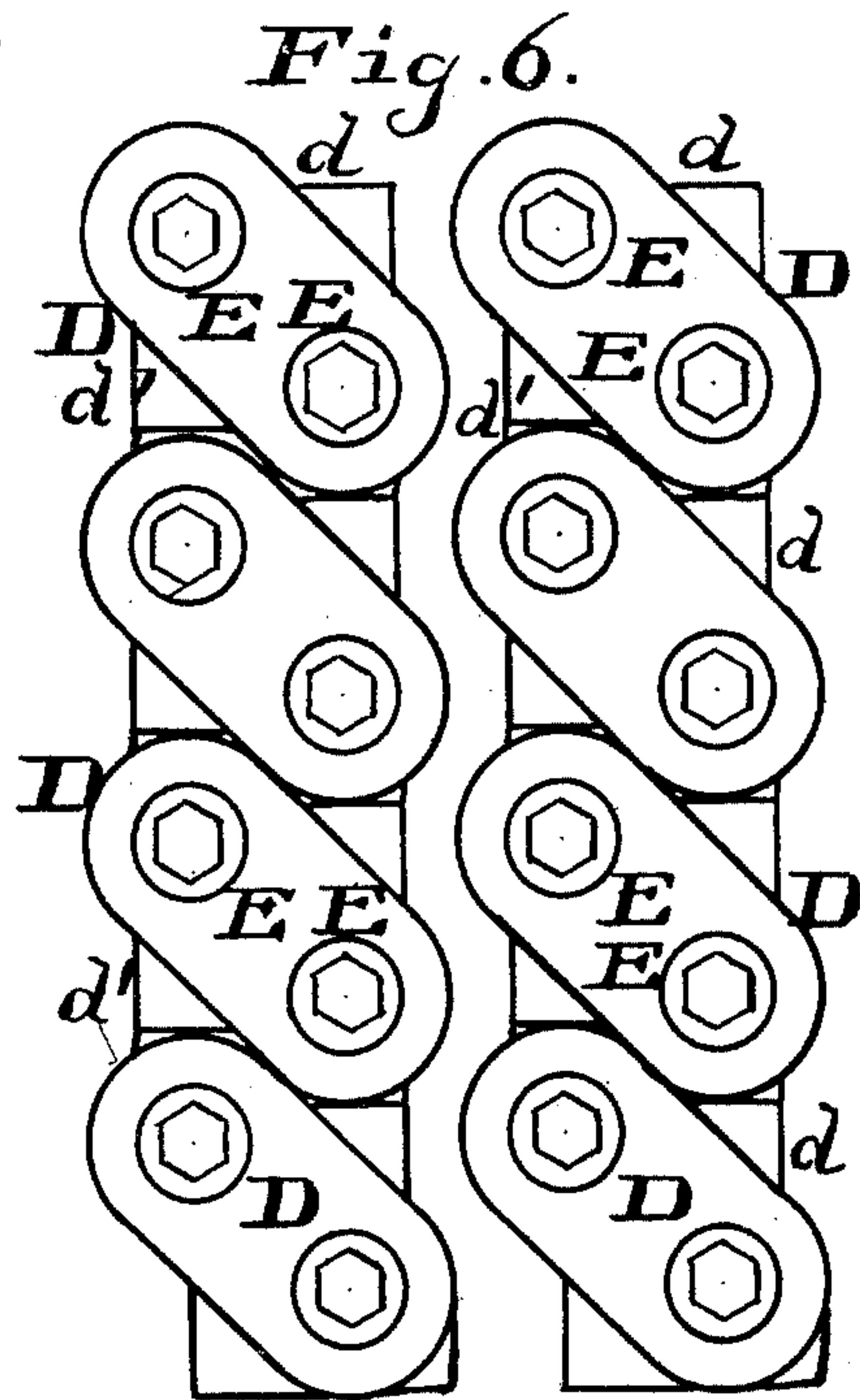
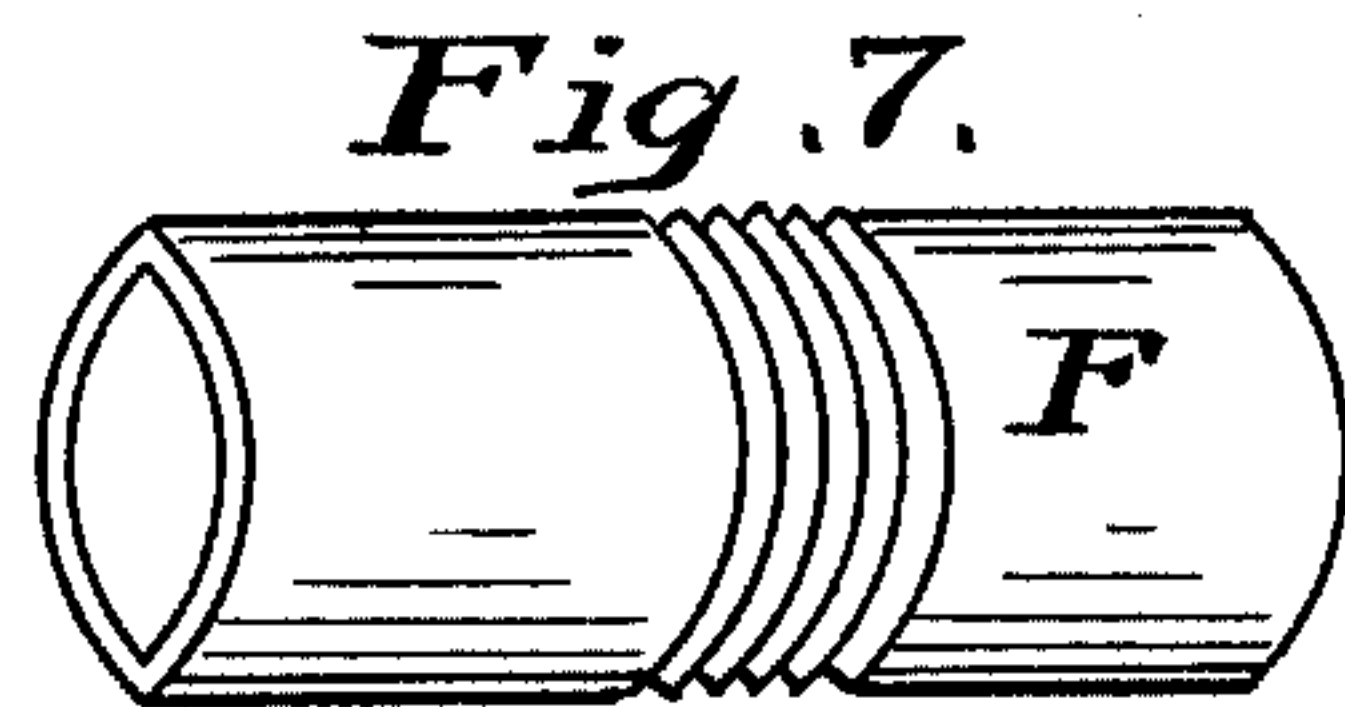
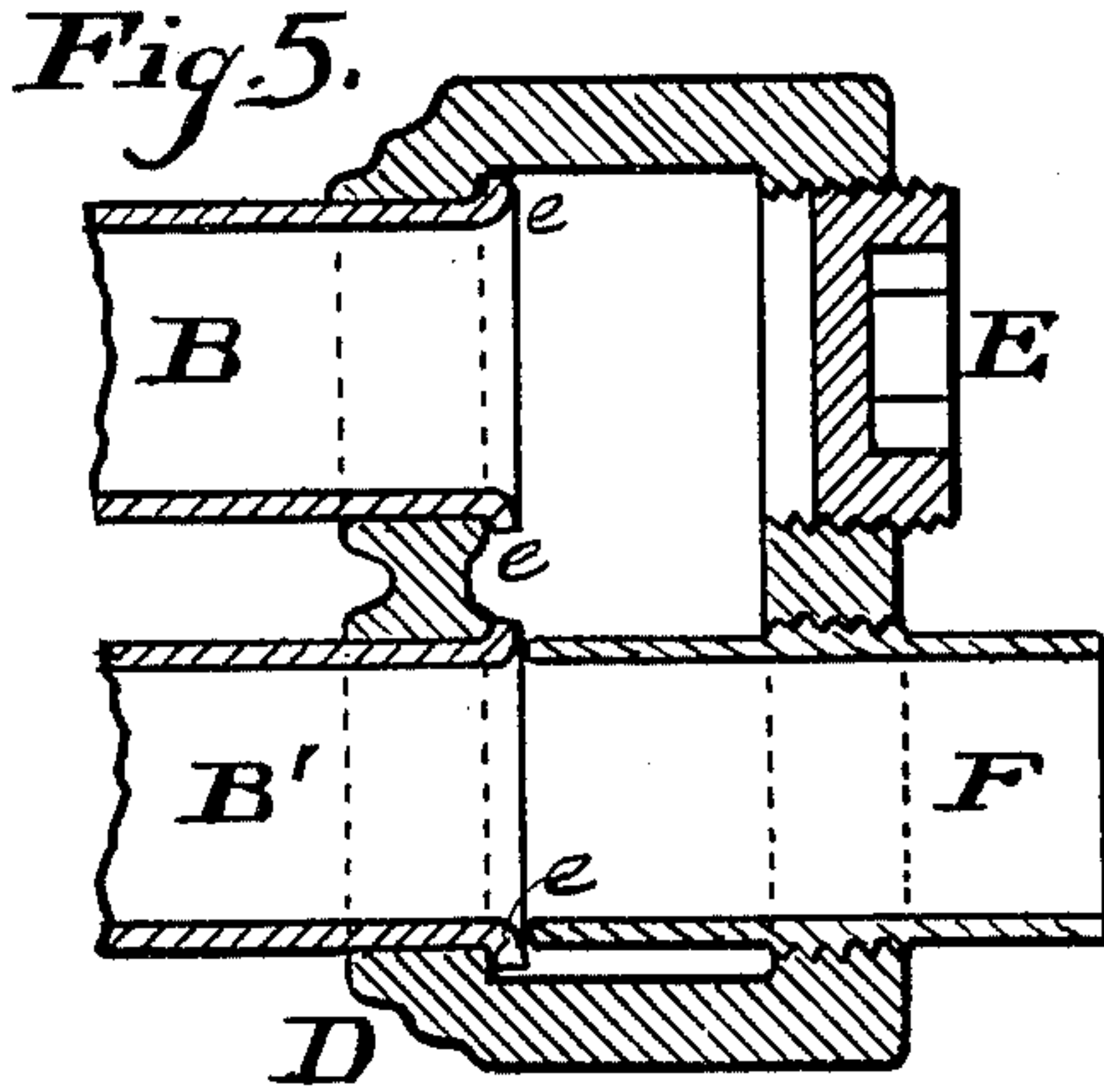
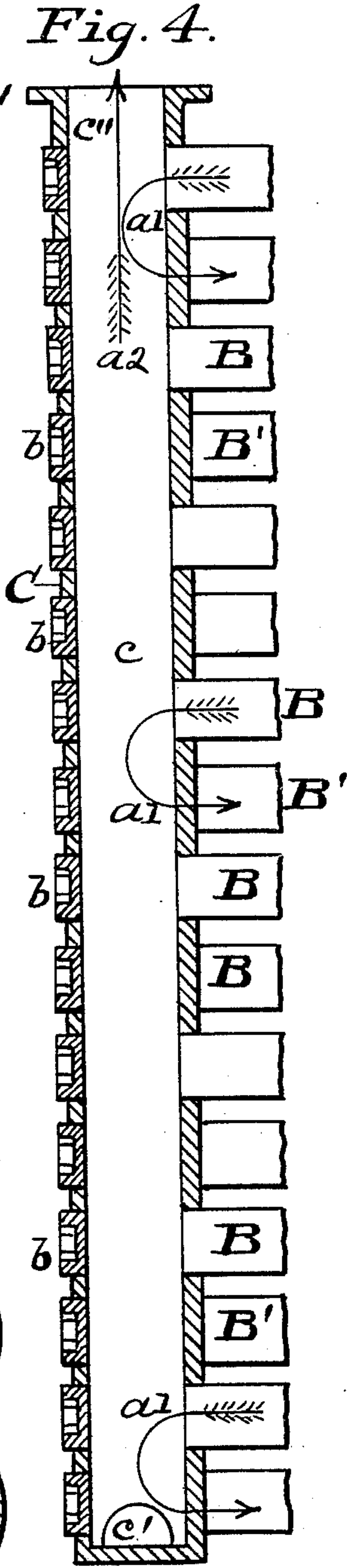
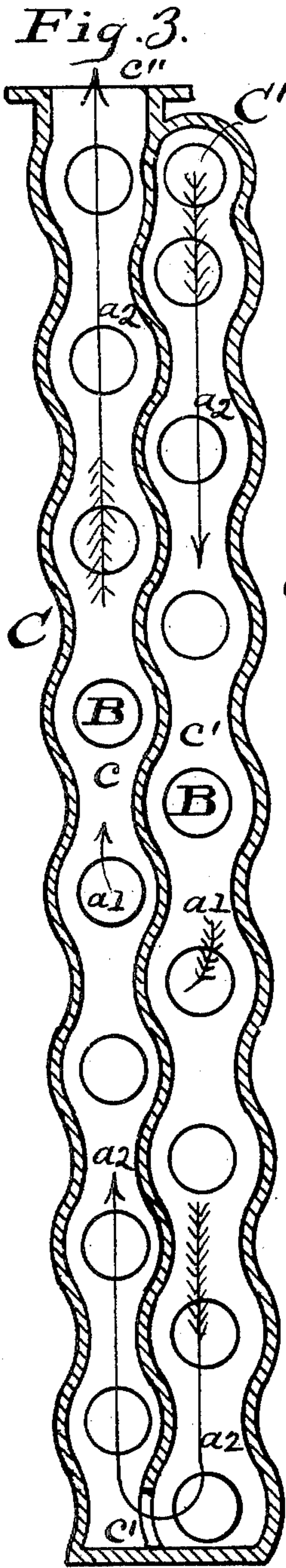
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WATER TUBE BOILER.

(Application filed Jan. 15, 1901.)

2 Sheets—Sheet 2.

(No Model.)



Witnesses,  
Jesse A. Farmer.  
L. C. Young

Inventor,  
George S. Wolf,  
per Geo. W. Tibbitts Attorney.



# UNITED STATES PATENT OFFICE.

GEORGE SAAL WOLF, OF WEST DOVER, OHIO, ASSIGNOR OF THREE-  
FOURTHS TO NICHOLAS J. BOYLAN, OF CLEVELAND, OHIO.

## WATER-TUBE BOILER.

SPECIFICATION forming part of Letters Patent No. 679,470, dated July 30, 1901.

Application filed January 15, 1901. Serial No. 43,436. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE SAAL WOLF, a citizen of the United States of America, and a resident of West Dover, Cuyahoga county, Ohio, have invented certain new and useful Improvements in Water-Tube Boilers, of which the following is a specification.

This invention relates to steam-boilers, and particularly to that class known as "water-tube" boilers; and it consists in the new and novel constructions and combinations whereby simplicity and cheapness of construction, ease and readiness of repair, and a perfectly natural circulation are the results, substantially as hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a front elevation with one-half of the front removed for showing interior construction. Fig. 2 is a side elevation with side wall removed for showing interior construction. Fig. 3 is a front elevation, enlarged, of one of the front tube-headers with the front wall removed for showing interior construction. Fig. 4 is a transverse vertical section of the same. Fig. 6 is a face view of the rear end return-tube connections. Fig. 5 is a vertical section of one of said return connections. Fig. 7 is a view of a removable clean-out sleeve.

A A represent the side and rear walls of the outer casing of the boiler, and A' the front, standing on a suitable foundation-frame A<sup>2</sup>. The fire-front openings and grates may be of the usual construction.

B B are a series of water-tubes horizontally disposed from front to rear and to any required height for a given capacity. These tubes are connected at the front and rear by means of new and peculiarly-constructed coupler-headers. The front header consists of coulomb couplers C, having two vertical chambers c c, which unite two vertical rows of alternating tubes B B'. In the front wall of said headers C are made holes directly opposite the ends of the tubes B and are closed by screw-plugs b b. These holes are for the convenience of getting into the tubes for cleaning. The sides of the headers C are made alternate swell curves for the purpose of

closely assembling them in compact form, as seen in Fig. 1. Each of said coulomb headers couple the upper and lower water-circulating tubes, as shown by arrows a', Fig. 4. In the lower end of the partition in said headers is made an arch-opening c' to provide a circulating communication between the two chambers. The top of one chamber is provided with connecting-neck c''.

D D are return-bend couplers for the rear ends of the tubes, and they consist of double tubular blocks connecting two of tubes B B' in diagonal lines, as shown. Each of said tubular blocks is provided with triangular lugs d d', by means of which they may be assembled one above another for support. The front openings in said blocks are closed with screw-plugs E E. The ends of the tubes B B' are secured in their seats in the blocks by expanding or beveling their ends, as seen at e e. F, Fig. 7, is a sleeve having a screw-thread about its middle, which is to be used in the said blocks D for cleaning-out purposes. They are to be inserted in the places of plugs E E, when so used, as seen in Fig. 5.

G is a steam-drum located over the tubes and is connected at the front end with the headers C C by a cross-header H, as seen in Figs. 1 and 2. Said cross-header H is provided with flanged nipples h h on the under side, by which they are secured by bolts to the necks c'' of the headers C C.

I is a large neck on the upper side of the cross-header H for making connection with the steam-drum.

J J are curved tubes connecting the under side of the steam-drum with the upper ends of the headers C C at C'. The circulation from the steam-drum to and through the headers C C and return is represented by the arrows a<sup>2</sup>.

K is a mud-drum placed at the back of the furnace and considerably below the lower line of water-tubes and is connected by a vertical pipe L with the lower back corner of the steam-drum.

M M are water-supply heating-coils.

The top of the boiler is covered with an arch roof R.

P is a draw-off pipe connected with the lower ends of the headers C C by short branches P'.

Having described my invention, what I claim is—

1. In a water-tube boiler the front headers C C' having two vertical chambers in communication at their bottom, and alternately swell-curved adjoining sides, alternately-arranged tube-seats in their rear walls, openings in their front walls and opposite to said tube and having removable plugs *b b* for closing said front openings, in combination with the tubes B B' and the cross-header H and steam-drum G, substantially as described.

2. In a water-tube boiler the headers C C' having two vertical chambers in communication at their bottom, the alternately swell-curved adjoining sides, the tubes B B' connected in alternate order with said header-chambers, the return-bend blocks D D con-

necting the rear ends of the tubes in like alternate order, the cross-header H connected to one of the chambers, respectively, with the headers C C', the tubes J J, attached to the second chambers in said headers C C', and the steam-dome G connected to the cross-header H and the said tubes J J, substantially as shown and described.

3. In combination with the return-bend blocks D D, provided with the supporting-lugs *d d'* and connected with the tubes B B', and having openings opposite to said tubes closed with removable plugs E E, of the insertible sleeves F, substantially as and for the purpose set forth.

Signed by me at Cleveland, Ohio, this 10th day of January, 1901.

GEORGE SAAL WOLF.

Witnesses:

GEO. W. TIBBITTS,  
JESSE A. FENNER.