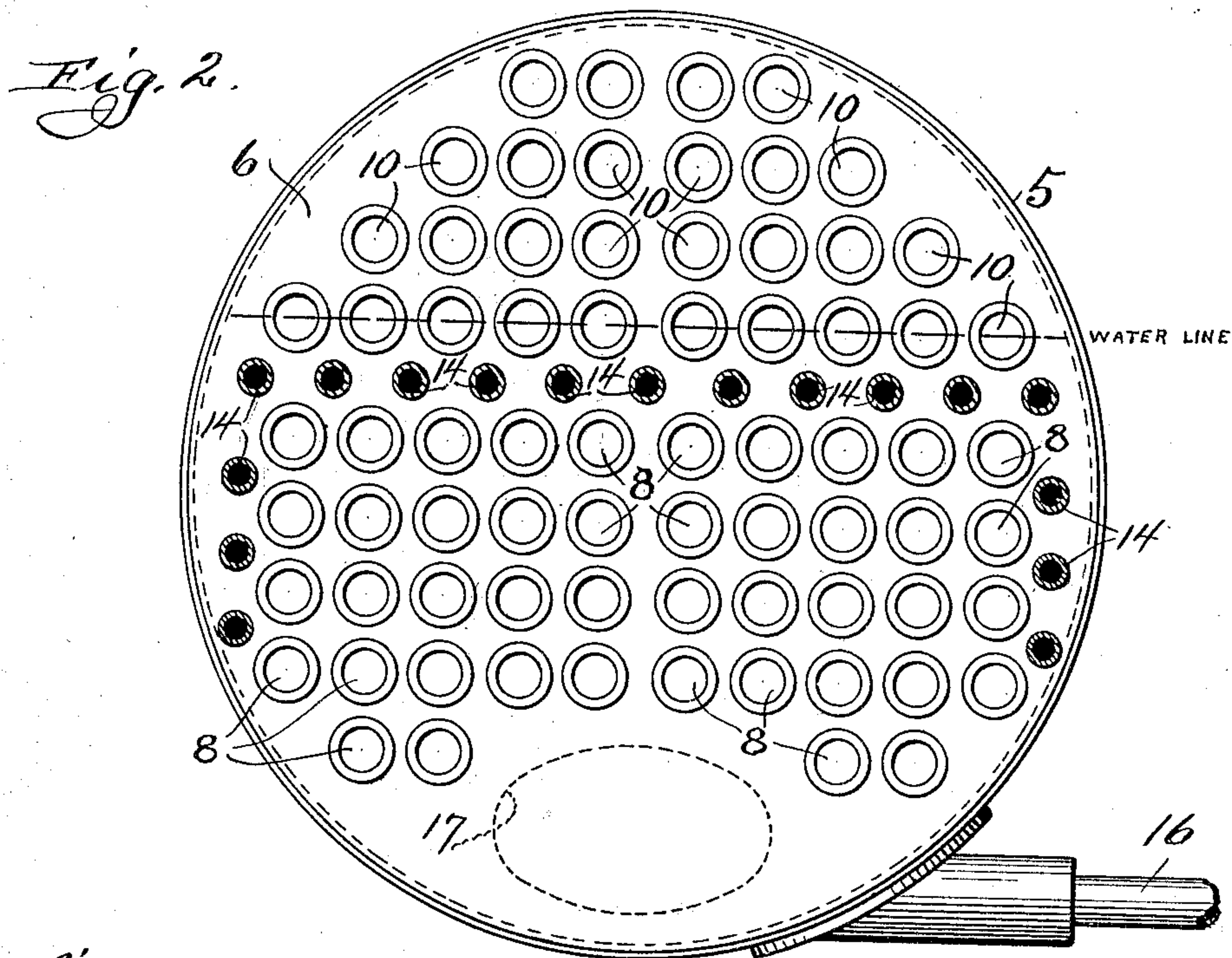
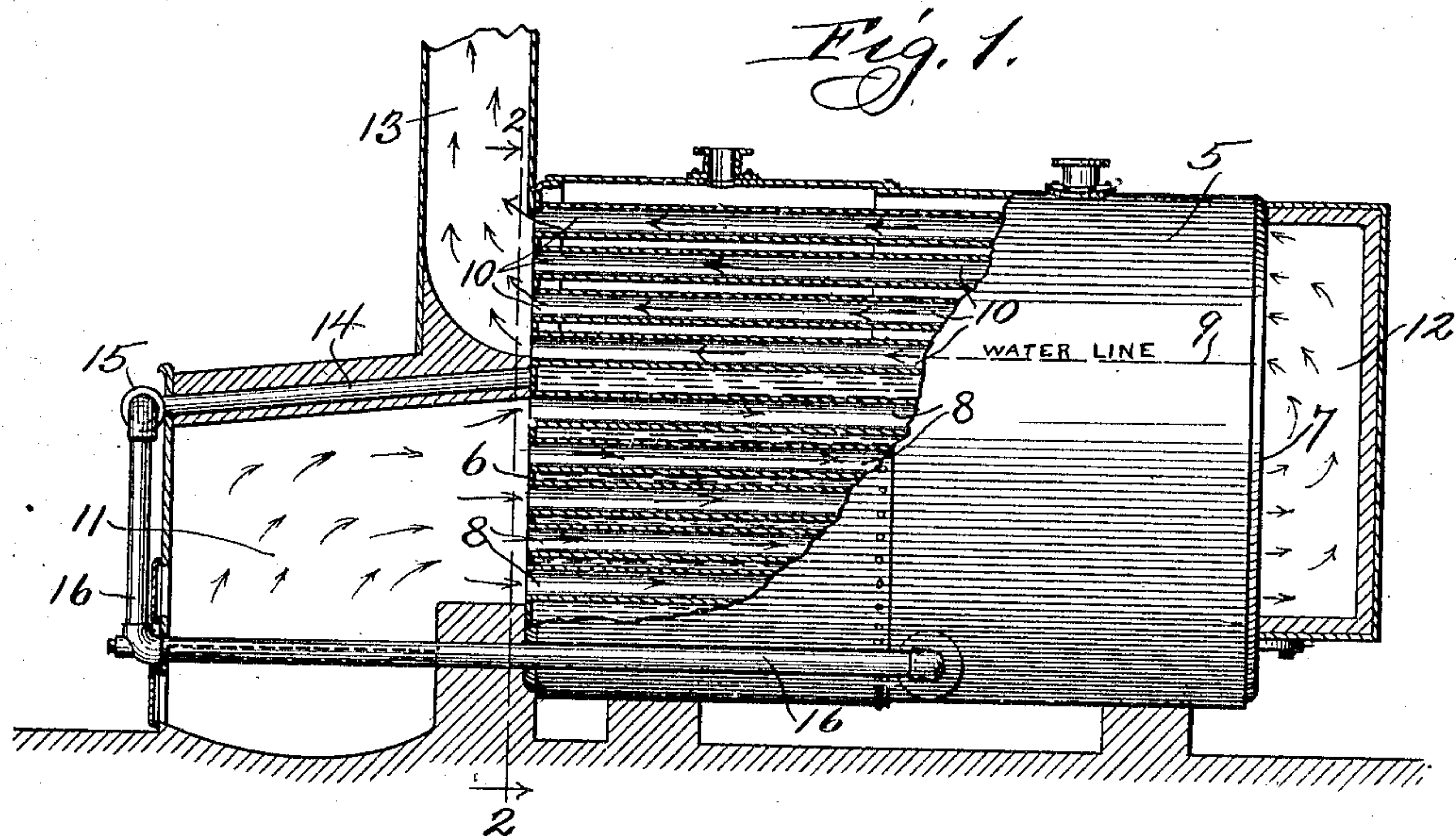


No. 871,201.

PATENTED NOV. 19, 1907.

G. Y. BONUS.  
SUPERHEATING BOILER.  
APPLICATION FILED JAN. 21, 1905.



Witnesses:  
Fred J. Schad Jr.  
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Atty.



# UNITED STATES PATENT OFFICE.

GEORGE Y. BONUS, OF CHICAGO, ILLINOIS.

## SUPERHEATING-BOILER.

No. 871,201.

Specification of Letters Patent.

Patented Nov. 19, 1907.

Application filed January 21, 1905. Serial No. 242,169.

*To all whom it may concern:*

Be it known that I, GEORGE Y. BONUS, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Fire-Tube Superheating-Boiler, of which the following is a specification.

My invention relates to boilers provided with flues and water tubes; and the objects of my invention are first, to arrange some of the flues below the water line and some above the water line; second to arrange water tubes about the fire place connected with the boiler; third, to make a cheap and durable construction and other objects to become apparent from the description to follow.

This boiler is constructed in the form of a large cylindrical shell closed at each end and having a plurality of flues passing longitudinally there-through; the flues being so distributed over the area of the ends or heads as to dispense with the customary stays for bracing the heads. The hot gases from the fire pass in one direction through a lower series of flues and in the reverse direction through an upper series of flues. Boilers have been made heretofore of similar appearance and also having a lower and upper series of flues for the passage of the hot gases in two directions, but the flues were all below the water-line and it was necessary to provide stays for the heads. In the boiler, forming the subject matter of this application the upper series of flues are located above the water-line to serve the two fold purpose of eliminating the stay rods and superheating the steam. I am not aware that a boiler of such description was ever made before my invention and I therefore claim such a construction broadly.

To more fully describe my invention I have illustrated the same on the accompanying sheet of drawing forming a part of this specification and in which

Figure 1 is a side elevation partly in section of the boiler and Fig. 2, is a section on line 2—2 of Fig. 1 with parts omitted.

Similar reference characters refer to similar parts throughout the several views.

The boiler 5 is cylindrical in form and is closed in front by the head 6 and in the rear by the head 7. A series of flues 8 are connected between the heads 6 and 7 below the water line 9, and a series of flues 10 are connected between the heads 6 and 7 above the water-line 9. The furnace or fire box 11 is

located directly in front of the flues 8 so that the hot gases pass into the forward ends of the flues 8, out the rear ends of the same, thence upward in the return chamber 12 provided at the rear end of the boiler 5, thence into the rear end of the flues 10 and finally out of the forward ends of the same into the chimney flue 13.

To increase the efficiency of the boiler a series of water tubes 14 are arranged in the walls of the fire box 11 preferably above the fire. One end of each tube 14 is connected with the interior of the boiler 5 below the water-line preferably through the head 6 between the flues 8 and 10, and the remaining end of each tube 14 is communicatively connected to the lower side of the boiler 5, preferably by connecting with a header 15 which is connected by means of a pipe 16 to the lower side of the boiler 5. The flues 8 are preferably arranged so closely about the man-hole 17 that no stays are required to brace the heads 6 and 7.

Having thus described my invention what I claim as new and desire to secure by Letters Patent of the United States is:—

1. In a boiler, a single compartment having a plurality of fire flues passing there-through, a portion of said flues being below the water line and a portion being above the water line, a fire box located outside of said compartment at one end thereof and communicating with said flues below the water line, a header arranged at the front end of said fire box having communication with the lower side of said compartment and a plurality of tubes connecting said header and said compartment a short distance below the water line serving as a lining for the fire box.

2. In a boiler, a single compartment having a plurality of fire flues passing entirely therethrough, a fire box located outside of said compartment at one end thereof and communicating with said fire flues, a header arranged at the front end of said fire box having communication with the lower side of said compartment and a plurality of tubes connecting said header and said compartment a short distance below the water line serving as a lining for the fire box.

3. In a boiler, a single compartment having a plurality of fire flues passing entirely therethrough, a fire box located outside of said compartment at one end thereof and communicating with said fire flues, a header arranged at the front end of said fire box



having communication with the lower side of said compartment and a plurality of inclined parallel tubes connecting said header and said compartment a short distance below the water line serving as a lining for said fire box.

4. In a boiler, a single compartment having a plurality of fire flues passing entirely therethrough, some of said flues located below the water line and some above the water line, a fire box located outside of said compartment at one end thereof and communicating with said fire flues below the water line, a return chamber outside of said compartment at the other end thereof communicating with all of said fire flues, a header arranged at the front end of said fire box having communication with the lower side of said compartment and a plurality of tubes connecting said header and said compartment a short distance below the water line serving as a lining for the fire box.

5. In a boiler, a single compartment for water and steam having a plurality of fire flues passing horizontally and entirely therethrough, some of said flues located below the water line and some above the water line, a fire box at one end and outside of said compartment communicating with said flues below the water line, a return chamber at the other end and outside of said compartment communicating with all of said fire flues, a header arranged at the front end of said fire box having communication with the lower side of said compartment and a plurality of tubes connecting said header and said compartment a short distance below the water line serving as a lining for the fire box.

6. In a boiler a cylindrical drum provided

on either end with a head, a plurality of fire flues passing through said drum having their ends secured in said heads, some of said flues located below the water line and some above the water line, a fire box located outside of said drum communicating with said fire flues below the water line, a return chamber outside of said drum communicating with all of said fire flues a header arranged at the front end of said fire box having communication with the lower side of said compartment and a plurality of tubes connecting said header and said compartment a short distance below the water line serving as a lining for the firebox and as means for the circulation of water.

7. In a boiler, a single compartment having a plurality of fire flues passing therethrough, a portion of said flues being below the water line and a portion being above the water line, a fire box located outside of said compartment at one end thereof and communicating with said flues below the water line, a header arranged at the front end of said fire box having communication with the lower side of said compartment and a plurality of inclined parallel tubes connecting said header and said compartment a short distance below the water line serving as a lining for the fire box.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses this 18th day of January, 1905, at Chicago, Illinois.

GEORGE Y. BONUS.

Witnesses:

R. J. JACKER,  
FRED. J. SCHAD, Jr.