

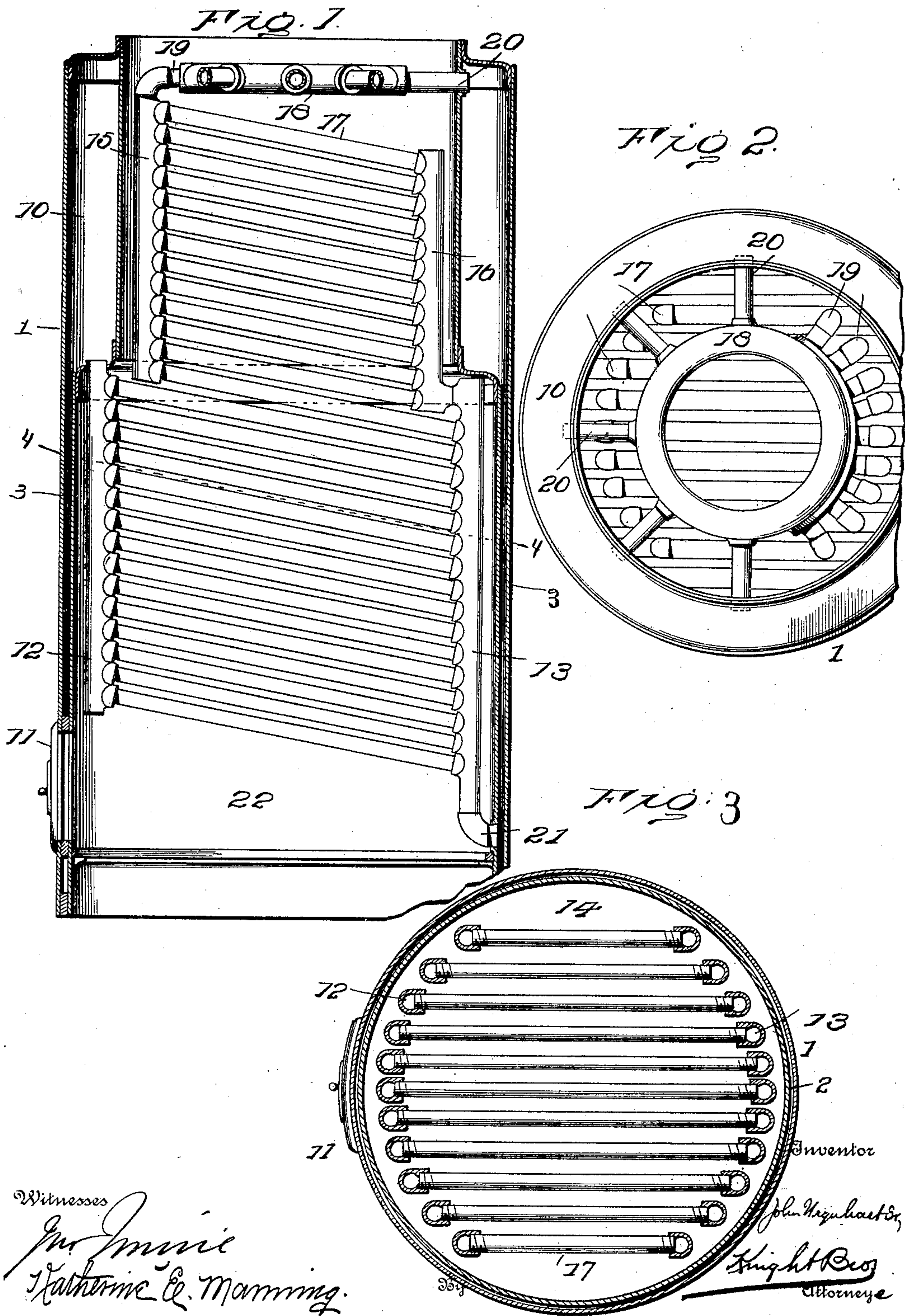
No. 686,868.

Patented Nov. 19, 1901.

J. URQUHART, SR.
VERTICAL WATER FLUE BOILER.

(Application filed Feb. 1, 1901.)

(No Model.)



UNITED STATES PATENT OFFICE.

JOHN URQUHART, SR., OF SENECA FALLS, NEW YORK.

VERTICAL WATER-FLUE BOILER.

SPECIFICATION forming part of Letters Patent No. 686,868, dated November 19, 1901.

Application filed February 1, 1901. Serial No. 45,607. (No model.)

To all whom it may concern:

Be it known that I, JOHN URQUHART, Sr., a citizen of the United States, residing in the city of Seneca Falls, in the State of New York, have invented certain new and useful Improvements in Vertical Water-Flue Boilers, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to sectional vertical water-flue boilers; and it consists of the parts and the combination of parts, as will be hereinafter more fully set out.

Figure 1 is a vertical section of the boiler with the sectional pipes in position. Fig. 2 is a top plan view of the boiler, the head-plate being removed. Fig. 3 is a transverse section on the line 4 4 of Fig. 1.

1 represents the outer shell, within which is mounted a cylindrical shell 2 of less diameter, thereby forming the leg or water-space 3.

4 represents lugs formed on the inside of the cylinder 2, upon which the grate 5 is adapted to rest.

6 is a casting firmly secured to the top of the inner shell 2, forming a cover for said shell having an upwardly-extending annular flange 7.

8 is another cylinder, one end of which is securely fastened within the annular flange 7, said cylinder extending upwardly above the top of the shell or jacket 1, said shell 1 and cylinder 8 being connected by means of the member 9. The space between the cylinder 8 and the outer shell 1 forms the steam space or dome 10.

11 is the fire-door.

12 and 13 are upright pipes, which are tapped at intervals throughout the length, the pipes 13 being of greater length than the pipes 12.

14 represents a series of pipes connecting the pipes 12 and 13 within the shell 3.

15 and 16 are a series of upright pipes located within the shell 8, the pipes 16 being connected by a suitable joint with the upright pipes 13, as shown in Fig. 1.

17 represents a series of pipes extending across the shell 8 and connected at each end to receive upright pipes 15 and 16. In this connection it will be noted that the series of

pipes 14 and 17 set at an angle to the sides of the cylinders or shells and that the upper ends of the pipes 12 are open and communicate with steam-dome 10.

18 is a circular hollow ring or pipe located in the top of the cylinder 8, adapted to receive the steam from the pipe-sections, there being a connection 19 between the pipes 15 and said ring.

20 represents steamways leading from the steam-ring 18 into the steam dome or space 10 of the boiler.

21 represents connections between the vertical pipes 13 and the lower end of the water-leg 3 in a boiler providing for the return.

22 is the fire-box or combustion-chamber of the boiler, immediately above which the series of pipes 14 are located.

The operation of the device is as follows:

The water enters the pipes at the lower end of the water-space at 21 and immediately opposite the door of the combustion-chamber, thence passing up through the various sections and discharging into the bottom of the steam-dome at one point, and the steam arising also passes through the series of pipes 17, the connection 19, and into the steam-ring 18, from which it passes, by means of steamways 20, into the top of the steam-dome on the opposite side of the boiler from that of the entrance of the steam into the dome from the pipes 14.

The construction of this boiler is such that any of the sections of pipe may be removed individually for the purposes of repair without interfering with the operation of the balance of the section. This system of piping can be used as a stationary boiler in connection with a suitable steam-dome and inclosed with brick or other material as a combustion-chamber.

What I claim, and desire to secure by Letters Patent, is—

1. In a boiler of the character described the combination with an outer and inner shell, a water leg or space formed between them, of a series of vertical pipes suitably tapped throughout their length and a series of pipes connecting said vertical pipes transverse of the boiler, and a steam-dome into which one of said pipes discharges.

2. In a steam-boiler the combination with

an outer and inner shell a water-leg formed between them and a steam-dome formed above the inner shell, of a series of vertical pipes arranged opposite each other, a series of diagonally-disposed pipes connecting the said vertical pipes transverse of the boiler and a connection between the water-leg and one series of said vertical pipes and a connection between the steam-dome and the other series of vertical pipes.

3. In a steam-boiler the combination with an inner and outer shell a water-leg between them of a series of vertical pipes arranged opposite each other, diagonally-disposed pipes connecting the series of vertical pipes one of the series of vertical pipes having a connection with the water-leg while the other series of vertical pipes discharges into the steam-dome, a second series of vertical pipes opposite each other and immediately above the series of vertical pipes first mentioned, a series of diagonally-disposed pipes connecting the second series of vertical pipes one series

of the second vertical pipes being connected with one series of the vertical pipes as mentioned and a connection between the other of the last-mentioned series of vertical pipes and the steam-dome.

4. In a steam-boiler the combination with an upper and lower series of vertical pipes diagonally-disposed pipes connecting the respective series of vertical pipes and connection between the water-leg and one series of the lower vertical pipes and a connection leading into the bottom of the steam-dome from the other series of vertical pipes, a steam-ring located above the upper series of pipes and having connection therewith and steamways leading from said steam-ring and discharging into the upper portion of the steam-dome.

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