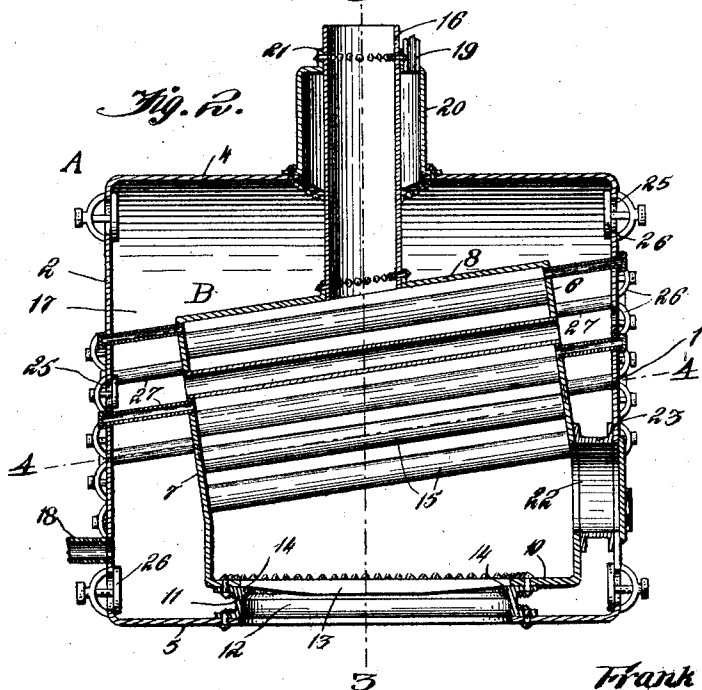
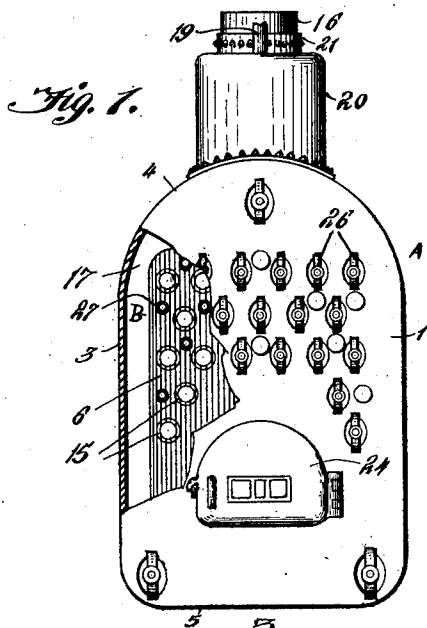


F. R. SARTOR.
WATER TUBE BOILER.
APPLICATION FILED OCT. 25, 1910.

1,003,297.

Patented Sept. 12, 1911.

2 SHEETS—SHEET 1.



Inventor
Frank R. Sartor

Witnesses

Alant Gomer

C. C. Hines

By *Victor J. Evans*

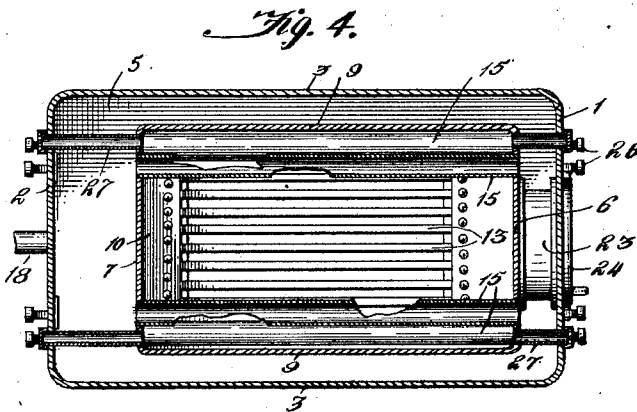
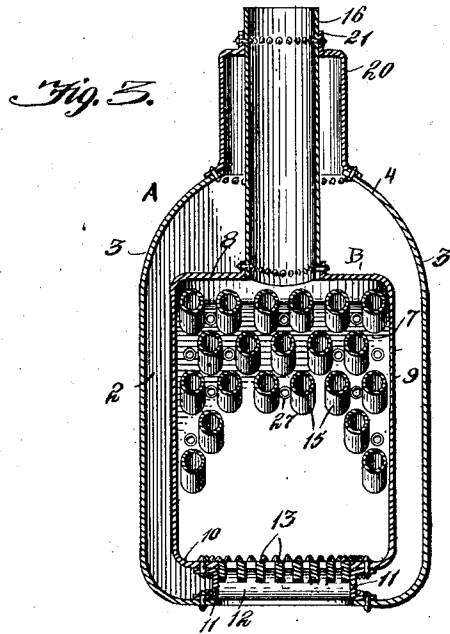
Attorney

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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

FRANK R. SARTOR, OF MUNCIE, INDIANA.

WATER-TUBE BOILER.

1,003,297.

Specification of Letters Patent.

Patented Sept. 12, 1911.

Application filed October 25, 1910. Serial No. 588,966.

To all whom it may concern:

Be it known that I, FRANK R. SARTOR, a citizen of the United States, residing at Muncie, in the county of Delaware and State of Indiana, have invented new and useful Improvements in Water-Tube Boilers, of which the following is a specification.

This invention relates to water tube boilers, the object of the invention being to provide a simple, inexpensive and compact type of boiler the parts of which may be readily assembled in setting up the boiler and disassembled in taking down or repairing the same and in which the parts are combined and arranged in a novel manner to secure a minimum amount of heating surface in a compact space without impairing the circulation of the water.

The invention consists of the features of construction, combination and arrangement of parts, hereinafter fully described and claimed, reference being had to the accompanying drawings in which—

Figure 1 is a front elevation, partially in section, of a water tube boiler embodying my invention. Fig. 2 is a central vertical longitudinal section of the same. Fig. 3 is a vertical transverse section on the line 3—3 of Fig. 2. Fig. 4 is a horizontal section on the line 4—4 of Fig. 2.

The boiler comprises an outer shell A and an inner shell B. The outer shell consists of a front wall 1, back wall 2, side walls 3, a top wall 4 and a bottom wall 5. The inner shell similarly consists of a front wall 6, rear wall 7, top wall 8, side walls 9 and a bottom wall 10.

The front and rear walls of the outer shell are straight and vertical, while the corresponding walls 6 and 7 of the inner shell are inclined upwardly and rearwardly at an oblique angle, the top wall 8 of said shell being also inclined, while the bottom wall 10 thereof is horizontal and annular in form and connected with the similarly shaped bottom wall 5 of the outer shell by the usual vertical mud ring 11 forming the ash space 12 below the grate 13 which rests upon suitable supports 14 carried by the mud ring.

The walls 6 and 7 form front and rear sheets to support the water tubes 15 which are arranged in parallel relation to each other and inclined at an oblique angle to the horizontal to correspond to the inclination of the top wall or crown sheet 8, by which arrangement of the water tubes such

tubes are confined within a minimum amount of space and yet disposed in such relation to the grate and the bed of fuel thereon as to be most effectually enveloped by the flames arising from the fuel and the smoke passing upwardly to the stack 16. Hence through the inclined arrangement of the tubes, the tubes will not only be intensely heated but the circulation of the water promoted through the aid of the force of gravity, thus utilizing all of the available heat units to heat the water to a high degree without obstructing or impairing the flow of the water through the tubes.

The described arrangement and outer and inner shells provides a water space 17 to which water is supplied through an inlet pipe 18, the steam discharging through the outlet 19. This outlet 19 is arranged at the upper end of the steam dome 20 carried by the top wall of the outer shell through which dome the smoke stack 16 extends. The stack projects centrally through the dome and is of less diameter than the same to provide intervening space or channel for the flow of the steam, the out-going steam being superheated by radiation from the stack. The dome is provided with a collar 21 secured in any suitable manner to the stack to secure an air and steam tight fit, the dome thus providing a drum heated from the stack, whereby a large proportion of the heat units usually allowed to go to waste are utilized to heat the steam to a high temperature.

The lower portions of the walls 6 and 7 are straight and parallel and the walls 1 and 6 at a point below the level of the forward ends of the water tube and above the level of the grate are cut away to provide a fuel inlet opening 22 separated from the water containing space by a ring or partition 23 forming a door frame, adapted to be closed by any suitable type of door 24 through which opening fuel is supplied to the grate as will be readily understood. The walls 1 and 2 are provided with suitable hand-holes 25 to permit access to the tube sheets 6 and 7 and tubes 15 for the purpose of cleaning or repairing said tubes, inserting new tubes and removing old ones, etc. These openings are closed by any suitable type of hand-hole plates or closures 26. Tubular stays 27 connect the walls 1 and 2 with the respective walls 6 and 7 and aid in supporting and preventing distortion of the tube sheets and also serve as inlets through which

tools or blasts of air may be introduced to clean out the soot or other foreign particles accumulating on the surfaces of the tubes. It will be observed that the tubes have a staggered arrangement, whereby they are more efficiently heated from the flowing products of combustion.

From the foregoing description, the construction, mode of use and advantages of my improved water tube boiler will be apparent, it is thought, without further description, the arrangement of the parts obviously providing for the collection of all the available heat from the fuel and its utilization in heating the water. By the construction, the boiler is further made compact and composed of comparatively a small number of parts which may be readily and conveniently assembled in setting up the boiler for use and disassembled in taking down the boiler or making repairs.

Having described the invention, what I claim is:—

A water tube boiler comprising an outer shell embodying top, bottom, side and end walls, the bottom wall and one of the end walls having openings therein, an inner shell

similarly constructed, the upper portion of said inner shell being inclined at an oblique angle to the outer shell, a ring disposed between and secured to the bottom walls of said shells and forming a grate support, a grate fitted within the bottom opening of the inner shell and resting on said support, a fuel inlet tube connecting the openings in the end walls of said shells, inclined water tubes extending through the inner shell and communicating with the outer shell and supported by the end walls of said inner shell, a steam dome rising from the top of the outer shell and having a contracted upper end, a smoke stack extending from the top of the inner shell and through said steam dome and connected with the contracted portion thereof, said stack being of less diameter than the body portion of the dome, and a steam exhaust pipe leading from the contracted portion of the dome.

In testimony whereof I affix my signature in presence of two witnesses.

FRANK R. SARTOR.

Witnesses:

CLYDE G. McCAHAN,
MICHAEL H. BRODERICK.