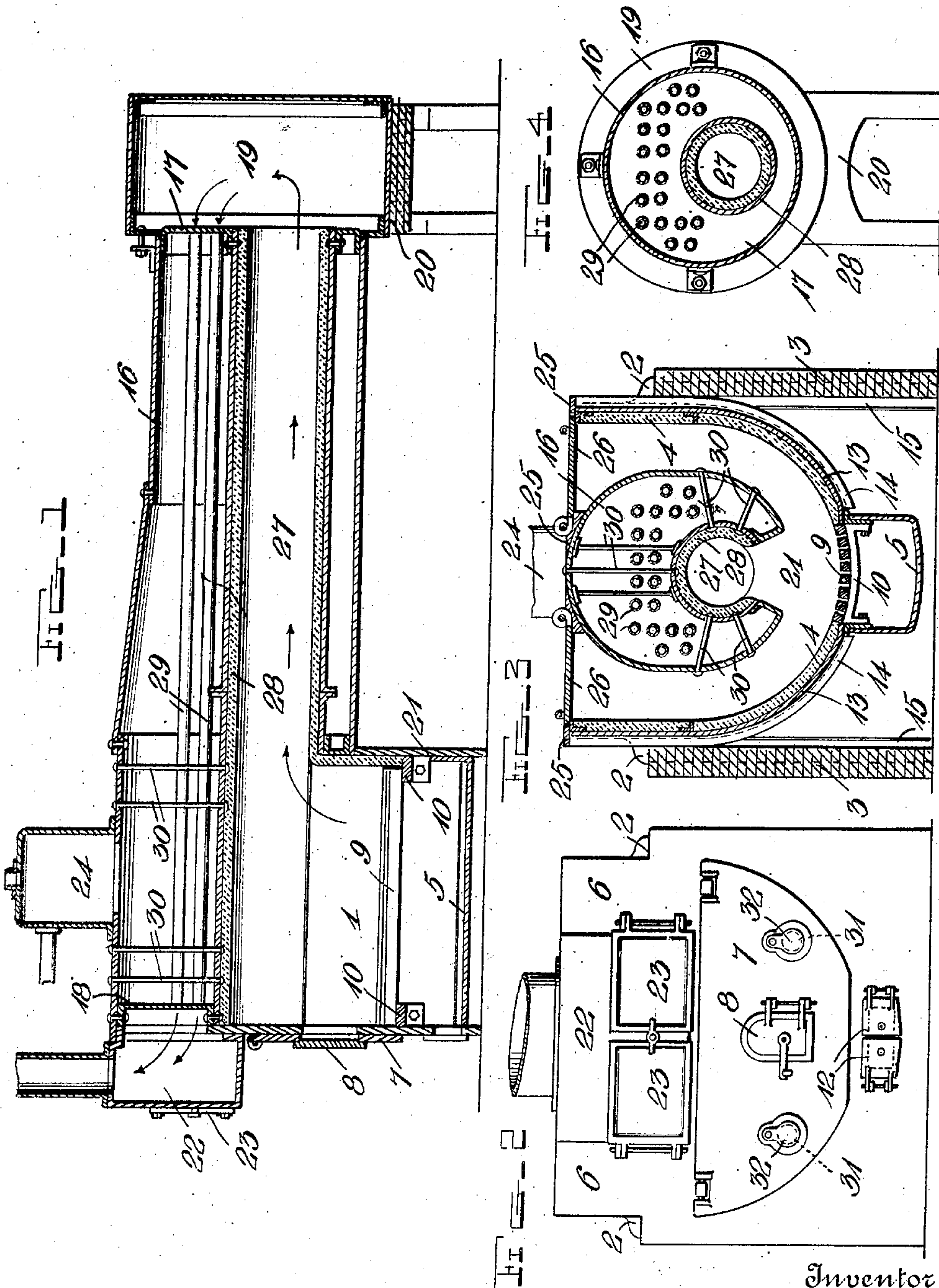


W. J. ELLIS.
 COMBINED BOILER AND FURNACE.
 APPLICATION FILED NOV. 9, 1908.

914,647.

Patented Mar. 9, 1909.



Witnesses

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COMBINED BOILER AND FURNACE.

No. 914,647.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, WILLIAM J. ELLIS, a citizen of the United States, residing at Andrews, in the county of Cherokee and State of North Carolina, have invented certain new and useful Improvements in a Combined Boiler and Furnace; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to a combined boiler and furnace.

The object of the invention is to improve the construction and arrangement of the boiler, fire box, combustion chamber and return flues whereby a maximum amount of heat and a perfect combustion may be obtained, thus providing for a great saving of fuel.

A further object is to provide an improved means for feeding fuel to the furnace whereby this operation is performed without endangering the eyes or person of the fireman.

With these and other objects in view, the invention consists of certain novel features of construction, combination and arrangement of parts as will be described and particularly pointed out in the appended claims.

In the accompanying drawings, Figure 1 is a central vertical longitudinal sectional view of my improved boiler and furnace; Fig. 2 is a front elevation of the same; Fig. 3 is a vertical cross sectional view through the fire box and front end of the boiler; and Fig. 4 is a similar view through the boiler and rear portion of the combustion chamber.

Referring more particularly to the drawings, 1 denotes the fire box, which is suitably arranged and supported by brackets, 2, between the usual masonry walls, 3. The fire box is provided with a lining of fire clay slabs, or bricks, 4. Below the fire box is arranged an ash pit, 5. The upper portion of the front end of the fire box is closed by a suitable wall or head, 6, while the lower portion thereof is closed by a large door, 7, preferably hinged at its upper edge and adapted to swing upwardly, as shown. In the door, 7, is arranged a smaller door, 8, for stoking purposes. Between the fire box and the ash pit is arranged a grate, 9, the bars of which preferably run longitudinally from one end of the box to the other and are supported at

their opposite ends upon curved grate supporting bars, 10. The ash pit, 5, is provided at its front end with suitable doors, 12. The ash pit and the outer shell, 13, of the fire box are preferably formed of sheet metal which is strengthened and braced by angle-iron bars, 14, to which are bolted angle-iron supporting bars, 15, around which the masonry supportings walls, 3, are built.

The boiler, 16, may be of any suitable shape and is here shown as having an oval-shaped forward end, which is arranged in the fire box and to taper rearwardly to a rear cylindrical portion. The rear end of the boiler is closed by a rear head or flue sheet, 17, while the front end of the boiler is closed by a head or crown sheet, 18. On the rear end of the boiler is arranged a cylindrical return smoke box, 19, said smoke box and rear end of the boiler being preferably supported by a wall, 20. The forward end of the boiler which projects into the fire box extends through a rear fire box wall, 21, and on the upper portion of its front end is arranged a smoke box, 22, to which the stack is connected. The outer or front end of the smoke box is preferably closed by two doors, 23, whereby access to the front end of the boiler is obtained. On the upper side of the fire box end of the boiler is arranged a steam dome, 24. The top of the fire box is closed by a suitable top plate, 25, through which the steam dome projects and in which, adjacent to each side of the fire box, are arranged fuel supplying doors, 26, whereby fuel is introduced into the fire box from the top of the same. This arrangement for feeding the fire box obviates the danger of injury to the eyes or person of the fireman, as frequently occurs from the intense heat where the firing doors are arranged on a line with the fire box.

Arranged in the boiler near its lower side and extending through the entire length of the same, is a cylindrical combustion chamber, 27, the inner walls of which are lined with suitable fire clay slabs or bricks, 28. The front end of the combustion chamber opens through the front end or crown sheet of the boiler, while the rear end opens through the rear flue sheet, 17, and into the return smoke box, 19. The front end of the combustion chamber is open at its lower side in the fire box and above the grate 9, so that the gases and products of combustion will enter said

chamber and be consumed therein, the smoke passing from the rear end of the chamber into the return smoke box, from which it is conducted through a series of return flues, 5 29, running the entire length of the boiler and into the front smoke box, 22, from which it is discharged through the stack connected thereto.

By arranging the combustion chamber near 10 the lower portion of the boiler, a space is provided above the chamber to accommodate the return flues which are arranged in the upper portion of the boiler, as shown. The combustion chamber is supported and held 15 in position throughout its length by a series of radially projecting tie or supporting bolts, 30, which are connected at their inner ends to the combustion chamber and at their outer ends to the outer wall of the boiler, as shown.

20 The boiler is provided with the necessary manholes and hand-holes, whereby access may be had to the interior of the same. If desired, air supply passages, 31, may be formed in the large door which closes the forward end of the fire box, said passages being 25 opened and closed by suitably pivoted cover plates, 32, whereby air may be supplied to the fire box. By providing the doors, 23, in the smoke box, 22, access may be had to the 30 return flues, 29, for the purpose of cleaning or renewing the same.

While my improved boiler and furnace are

here shown and described in the form of a stationary boiler, it is obvious that the same may be readily constructed and employed as 35 a portable boiler for the use of locomotives, traction engines or the like, and will be found superior for use as a marine boiler and furnace.

Having thus described my invention, what 40 I claim as new and desire to secure by Letters-Patent, is:

A combined boiler and furnace comprising a fire box substantially U-shape in cross section, an inverted U-shaped boiler suspended 45 in said fire box and having a cylindrical lateral extension, said boiler being closed at both ends, smoke boxes arranged at the front and rear of said boiler, a cylindrical flue extending the full length of said boiler and connect- 50 ed at its opposite ends with said fire box, and said rear smoke box respectively, return flues extending through said boiler and connecting said smoke boxes, doors arranged at the top of the fire box, and a flue connecting with the 55 front of same box.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

WILLIAM J. ELLIS.

Witnesses:

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E. EDMONSTON, Jr.