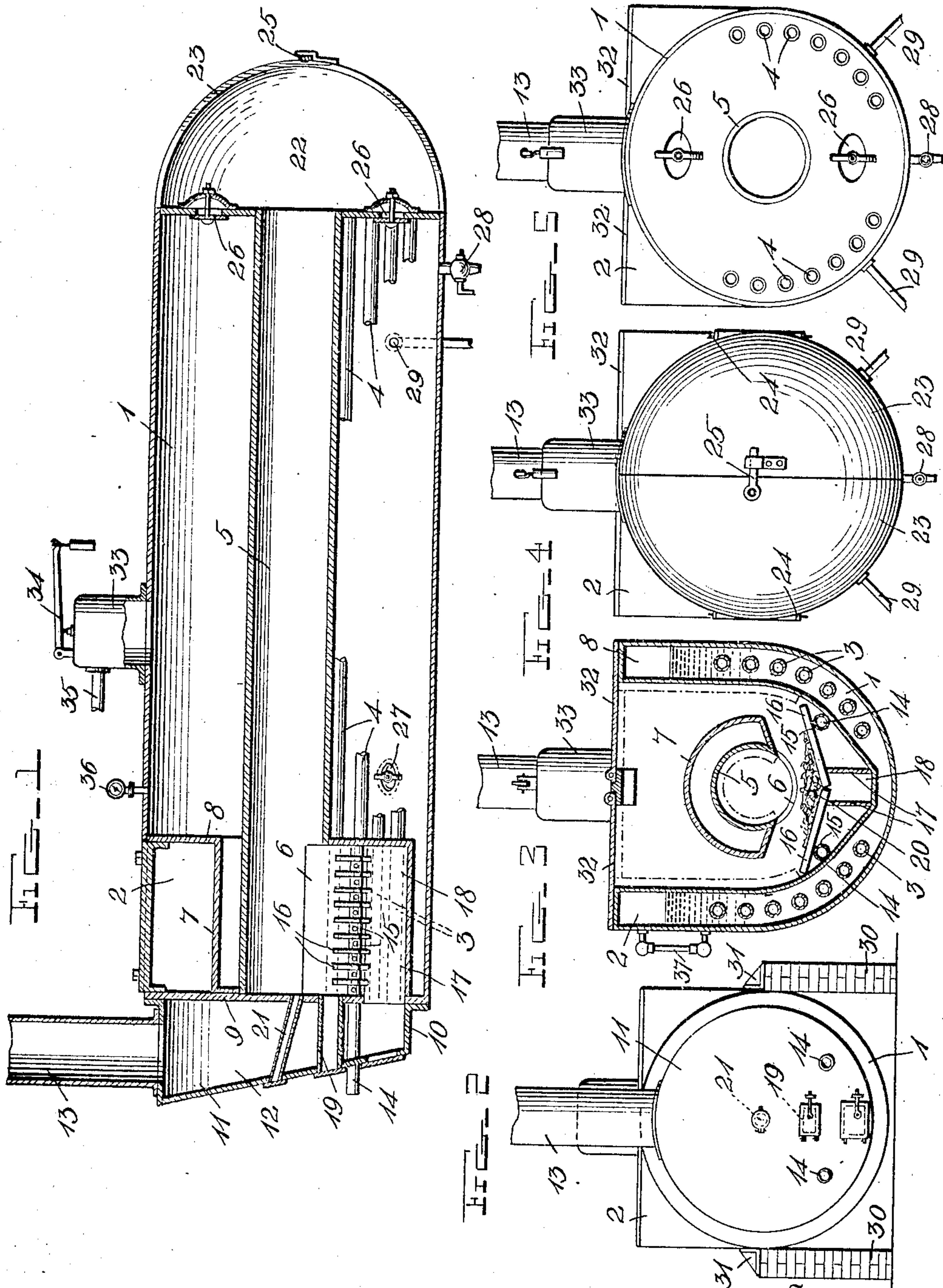


No. 882,456.

PATENTED MAR. 17, 1908.

W. J. ELLIS.
COMBINED BOILER AND FURNACE.

APPLICATION FILED AUG. 8, 1907.



Witnesses
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UNITED STATES PATENT OFFICE.

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COMBINED BOILER AND FURNACE.

No. 882,456.

Specification of Letters Patent.

Patented March 17, 1908.

Application filed August 8, 1907. Serial No. 387,675.

To all whom it may concern:

Be it known that I, WILLIAM JEFFERSON 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, and has for its object to provide a device of this kind which will be very compact, and in which a very great economy in fuel can be effected.

In the accompanying drawings, which illustrate the invention,—Figure 1 is a longitudinal sectional view of one form of boiler and furnace embodying my invention; Fig. 2 is a front elevation of the same; Fig. 3 is vertical transverse sectional view taken through the fire box; Fig. 4 is a rear end view of the boiler; Fig. 5 is a similar view of the boiler with the smokebox removed.

Referring more particularly to the drawings, 1 indicates the boiler, which is of the usual cylindrical construction and is provided with an extension 2 at the forward end, which forms the outside wall of the firebox. The extension is substantially U-shaped in cross section and is preferably provided with tubes 3, which may be extensions of tubes 4, extending longitudinally through the boiler.

A tube or cylinder 5 extends from end to end through the boiler, substantially axially thereof and also projects through the firebox, and forms a combustion chamber, the forward end of which opens into the firebox through a longitudinal slot or opening 6 in the under side of its forward end. A water jacket 7 is formed around the tube or combustion chamber 5 within the firebox so as to protect it from the excessive heat.

A head 8 is secured to the boiler at the rear of the fire box, and a plate 9 is secured to the boiler head in any suitable manner and closes the forward end of the fire box and the tube or combustion chamber 5. The plate 9 is formed or provided with a hollow front 10 to which is secured a plate 11, which forms the usual smokebox 12 from which the smokestack 13 extends upwardly in the usual manner.

Projecting through the plates 11 and 9 and extending to the rear end of the fire box

are two hollow tubes 14, which are perforated upon one side within the firebox, as shown at 15. Grate bars 16 rest at their outer ends upon the tubes 14 and have their inner or adjacent ends resting upon the top of the walls 17, which form the ash-pit 18. Any suitable means may be provided for injecting air through the tubes 14 and perforations 15 into the firebox for increasing the combustion, and especially when using coke or similar material. A tube or shell 19 communicates at its ends with openings in the plates 11 and 9, and thereby forms a stoke hole through which the fuel 20 upon the grate may be stirred or broken up to increase the combustion. A passage or opening 21 is also formed through the plates 11 and 9 in alinement with the combustion chamber, which forms a peep-hole, through which the condition of the fire may be observed. Each of these openings is closed at its outer end with the usual hinged door or other desired form of closure.

A smokebox 22 is formed at the rear end of the boiler by a suitable shell or casing, preferably in the form of two semi-spherical doors 23, hinged to the sides of the boiler, as shown at 24, and are held together in their closed position by means of a latch 25. Man-holes 26 are formed in the rear end of the boiler and hand-holds 27 are preferably formed near the forward end of the boiler to the rear of the firebox. A mud drain valve 28 is provided in the bottom of the boiler, preferably at the rear end. A water inlet 29 is provided for the boiler, preferably near the rear end and upon each side of the boiler.

By constructing a boiler and furnace as above described, the usual brickwork for forming the firebox around the outside of the boiler is dispensed with, and the boiler can be supported upon suitable columns 30, as of brickwork, by means of the ordinary brackets 31; but if desired the firebox and combustion chamber may be lined with fire-clay slabs or brick, as shown in dotted lines in Fig. 3. Fuel is fed to the furnace through doors 32 that close the top of the space between the extension 2 and the water jacket 7, as shown in Fig. 3, from whence it passes down onto the grate bars by gravity. By feeding the fuel in this manner the intense heat of the fire first drives off the gases of the fuel, which are caused to pass down through the fire and into the combustion chamber where they are consumed, and thereby a

smokeless furnace is provided. After that the solid portions of the fuel are consumed with the result that the amount of ashes and non-combustible material is reduced to a minimum. After passing out of the rear end of the combustion chamber the products of combustion and heated gases are returned through the flues in the boiler to the forward end; from thence they escape through the smokestack.

When desired, the smokestack may be arranged at the rear end of the boiler in the usual manner. One or more steam domes may be provided for the boiler which can be provided with the usual safety valve 34, and the steam pipe 35. A steam gage 36 is provided and also a water column 37.

Having described my invention, I claim:—
A combined boiler and furnace, comprising a boiler having an open topped firebox at one end and a smoke box arranged at each end,

a combustion chamber extending centrally through said boiler and communicating at its opposite ends with said smoke boxes, and having an opening in its bottom communicating with said firebox, a water jacket surrounding the upper portion of said chamber within the firebox, said boiler having a fuel supply opening arranged above the jacket portion of said combustion chamber, tubes extending through said boiler and connecting said smoke boxes, and a plurality of air supply passages through the front smoke box into the fire box.

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

WILLIAM JEFFERSON ELLIS.

Witnesses:

FRANK S. COVER,
C. F. WOODWARD.