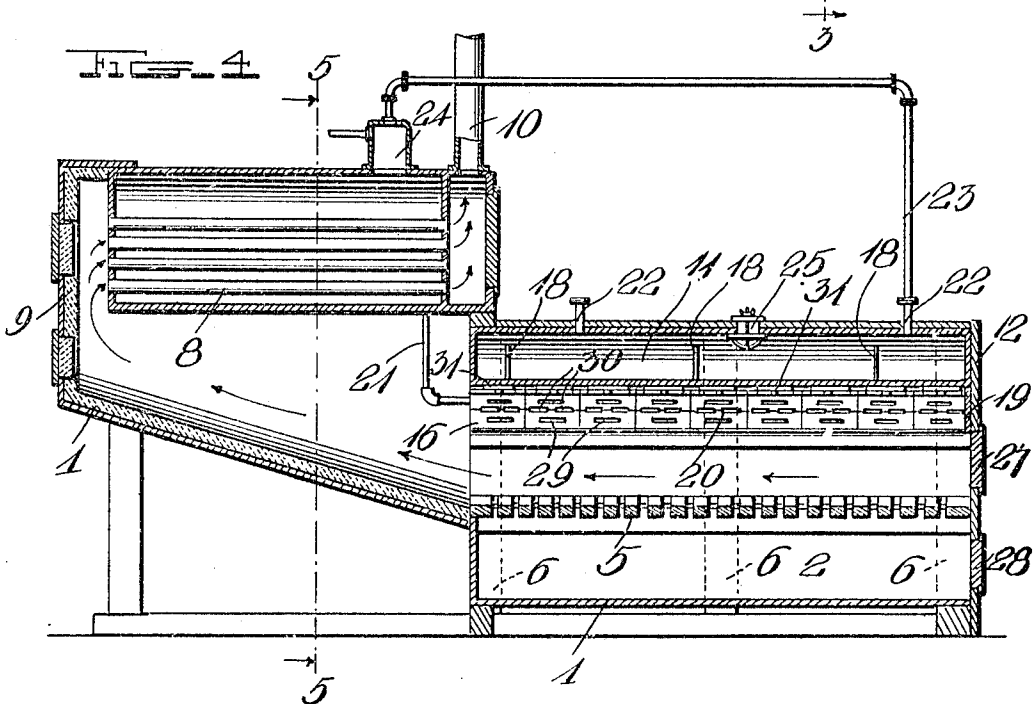
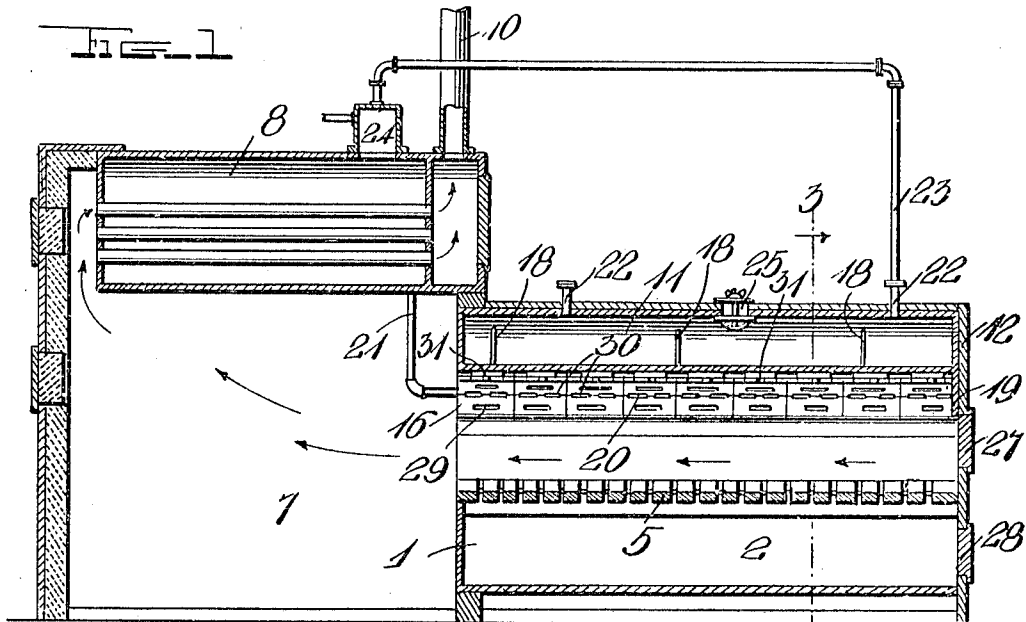


W. J. ELLIS.
STEAM BOILER FURNACE.
APPLICATION FILED MAY 6, 1909.

950,662.

Patented Mar. 1, 1910.

2 SHEETS—SHEET 1.



Witnesses

C. H. Griesbauer.

Inventor
William J. Ellis

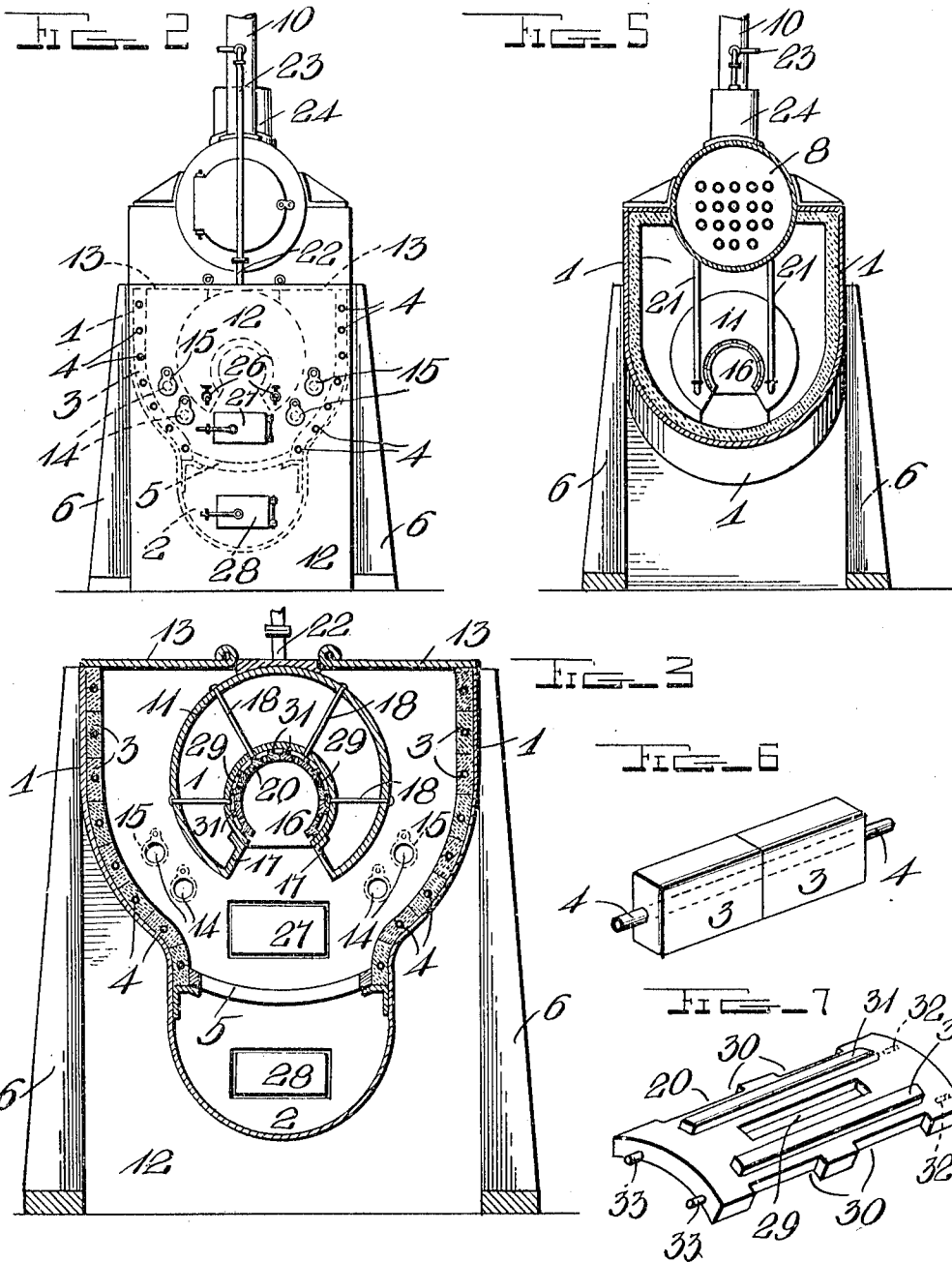
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UNITED STATES PATENT OFFICE.

WILLIAM JEFFERSON ELLIS, OF ANDREWS, NORTH CAROLINA.

STEAM-BOILER FURNACE.

950,662.

Specification of Letters Patent.

Patented Mar. 1, 1910.

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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 Steam-Boiler Furnaces; 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 improvements in steam boiler furnaces.

One object of the invention is to provide a furnace and supplemental boiler adapted to be attached to steam boilers already installed or in use to take the place of the old furnace and to increase the capacity of the boiler, and at the same time reducing the consumption of the fuel and decreasing the labor required for running or attending to the furnace.

Another object is to provide a furnace and supplemental boiler adapted to be attached to steam boilers already installed or in use to take the place of the old furnace and which itself forms a support for the old boiler.

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

In the accompanying drawings, Figure 1 is a vertical longitudinal sectional view of the invention, showing the manner in which the same is attached to the furnace of an old boiler; Fig. 2 is a front end view of the same; Fig. 3 is a vertical cross sectional view, on the line 3—3 of Fig. 1; Fig. 4 is a vertical longitudinal sectional view of the invention, showing the construction of the same when arranged to support an old boiler; Fig. 5 is a vertical cross sectional view on the line 5—5 of Fig. 4, looking in the direction of the arrow; Fig. 6 is a detail perspective view of a part of the fire brick lining of the fire box, showing the manner in which the sections of the lining are held together; Fig. 7 is a detail perspective view of one of the sections of the fire brick lining for the combustion chamber of the fire box.

In the embodiment of the invention, I provide a fire box 1, which is formed of heavy sheet metal and is preferably U-shaped in cross section and is extended downwardly below the grate to form an ash pit 2. The fire box is provided with a fire brick lining 3 which is preferably constructed in sections of suitable size and of a shape to conform to the shape of the box. The sections of the fire brick lining 3 are preferably held together in operative position by means of tubular rods or pipes 4 which are inserted lengthwise therethrough, adjacent to the upper and lower edges of the sections. The tubular rods or pipes 4 extend throughout the length of the fire box and open through the ends of the same, as shown in the drawings, thus permitting a circulation of air through the same which prevents the warping and melting or burning out of the pipes. In the lower portion of the fire box, is arranged a suitable grate 5 and the fire box is supported by suitable legs or supporting braces 6, of which there may be any desired number, and which are preferably arranged as shown.

In Figs. 1, 2 and 3 of the drawings, the fire box 1 is shown as being attached to the front end of the furnace 7 and supporting base of an old steam boiler and when thus connected up, the front or outer end of the old furnace and fire box is removed and the rear end of the fire box 1 is suitably connected therewith. In Figs. 4 and 5 of the drawings, the invention is shown as arranged to take the place of the old furnace and fire box and to form a support for the old boiler. In the latter form of the invention, the fire box 1 is extended rearwardly a sufficient distance to receive the old boiler 8 which is mounted in the upper portion of the rearwardly extended end of the fire box in any suitable manner, and the rear end of the extended portion of the fire box projects beyond the rear end of the boiler and is closed by a suitable cover plate 9 whereby a space is provided to permit the smoke and products of combustion from the fire box to enter the flues at the rear end of the boiler and pass through the same to the smoke stack 10 arranged at the front end of the boiler, as shown.

Arranged in the upper portion of the fire

box 1 is a supplemental boiler 11, said boiler being approximately inverted U shaped in cross section as shown in Fig. 3 and extends throughout the length of the fire box and has its ends arranged in the opposite end plates 12 of the fire box. The boiler 11 is of less diameter than the fire box thus providing a space between the sides of the boiler and the adjacent sides of the fire box, said space being closed at the top of the fire box by suitable doors 13 which are preferably hinged to the top of the boiler, as shown, and are adapted to be opened to permit the feeding of fuel to the fire box. In the front or outer wall or end plate 12 of the fire box and opening into the space between the boiler and the adjacent side wall of the fire box, are a series of stoke holes 14 through which a stoking tool may be inserted. The holes 14 are covered by suitable cover plates 15.

Arranged in the lower portion of the boiler and extending longitudinally there-through is a cylindrical combustion chamber 16 which opens through the bottom of the boiler and connects with the fire box along the entire length of the same. The combustion chamber 16 is preferably formed of sheet metal and is supported upon inwardly projecting flanges 17 formed in the lower side of the boiler, as shown. The combustion chamber is held in position and braced by a series of radially projecting brace rods 18 secured therein and in the adjacent sides of the boiler. The outer end of the combustion chamber 16 opens through the end wall of the boiler and is closed by a suitable head 19. The inner or rear end of the combustion chamber opens into the fire box 7 of the old boiler or into the extension of the fire box 1 so that the products of combustion may pass therethrough and into said extension or old fire box and through the same to the return tubes of the boiler. The combustion chamber 16 is preferably provided with a fire brick lining 20 whereby the walls of the same are protected from the intense heat of the fire.

The supplemental boiler 11 is connected at its inner end to the forward end of the old boiler by water conducting pipes or tubes 21, one of which connects with each leg of the boiler, as shown in Fig. 5 of the drawings. The upper portion of the boiler is provided, adjacent to its front and rear ends, with pipe connections or fittings 22, with one of which is connected a steam conducting pipe 23, which connects at its opposite end with the steam dome 24 of the old boiler. The pipe 23 may be connected with either of the fittings 22 but is here shown and is preferably connected with the fitting at the outer end of the boiler. In the upper portion of the boiler is also formed a man-hole 25 which is

closed by a suitable cover. In the outer end of the boiler, adjacent to the lower ends of the boiler legs, are blow-out or mud valves 26. The front end of the fire box and the ash pit are provided with the usual clean-out doors 27 and 28.

The lining 20 of the combustion chamber is preferably constructed in the form of sections shaped to fit the chamber and said sections are each provided with a central longitudinally disposed slot or passage 29 and along each edge are formed with longitudinally disposed notches 30 which, when the sections are engaged to form the lining, provide additional slots or passages which permit the flame or heat from the fire to pass through the lining. The sections of the lining are also provided on their outer walls with longitudinally disposed spacing ribs 31 which engage the inner wall of the combustion chamber and separate the lining from the inner wall thereby providing a space through which the heat and flame entering the slots 29 and notches 30 passes between the lining and the adjacent wall of the chamber, thus increasing the heating capacity of the same. The sections of the lining 20 may be provided in their opposite ends with sockets 32 to receive connecting pins 33 whereby the sections may be more firmly secured together in operative position to form the lining.

From the foregoing description, taken in connection with the accompanying drawings, the construction and operation of the invention will be readily understood without requiring a more extended explanation.

Various changes in the form, proportion and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of the invention, as defined in the appended claims.

Having thus described my invention, what I claim is:

1. The combination with a steam boiler having a furnace arranged thereunder, of an auxiliary boiler arranged in front of said furnace and having a combustion chamber extending throughout its length and opening at one end into said furnace, a fire box substantially surrounding said boiler and communicating with the combustion chamber throughout its length, circulating pipes connecting said auxiliary boiler with the other boiler, and a pipe connecting the steam space of said auxiliary boiler with the dome of the other boiler.

2. The combination of a fire box, a boiler arranged in said fire box, a combustion chamber extending longitudinally throughout the length of said boiler and communicating throughout its length at its lower side with the fire box, a lining for said combus-

tion chamber spaced slightly from the walls thereof, and having openings therein to permit the flame or heat from the fire to pass through the lining into contact with the walls of the chamber to facilitate the generation of the steam in the boiler.

In testimony whereof I have hereunto set

my hand in presence of two subscribing witnesses.

WILLIAM JEFFERSON ELLIS.

Witnesses:

E. EDMONSTON, Jr.,
C. E. HUNT.