

July 9, 1929.

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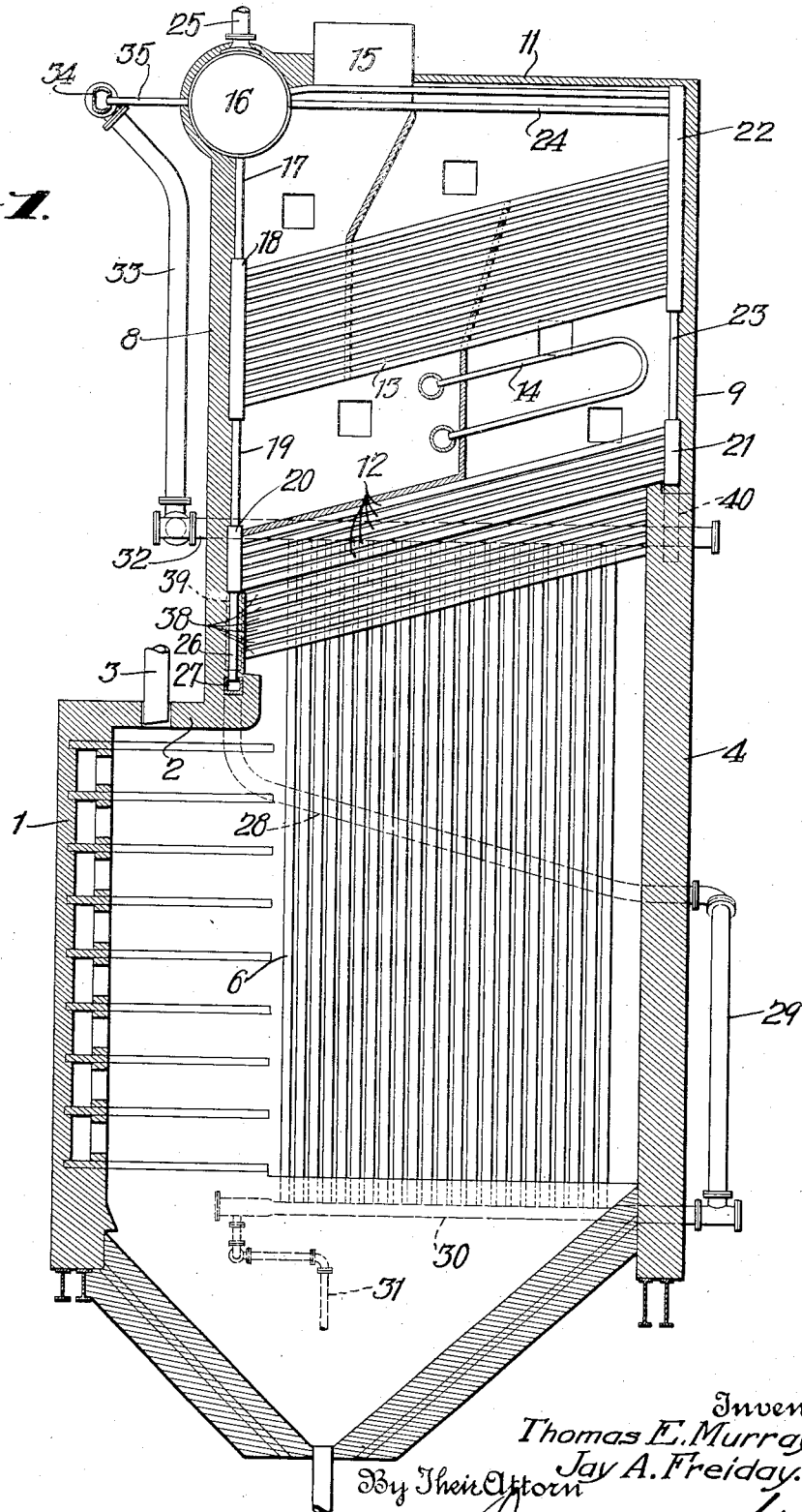
1,720,090

BOILER

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2 Sheets-Sheet 1

Fig. 1.



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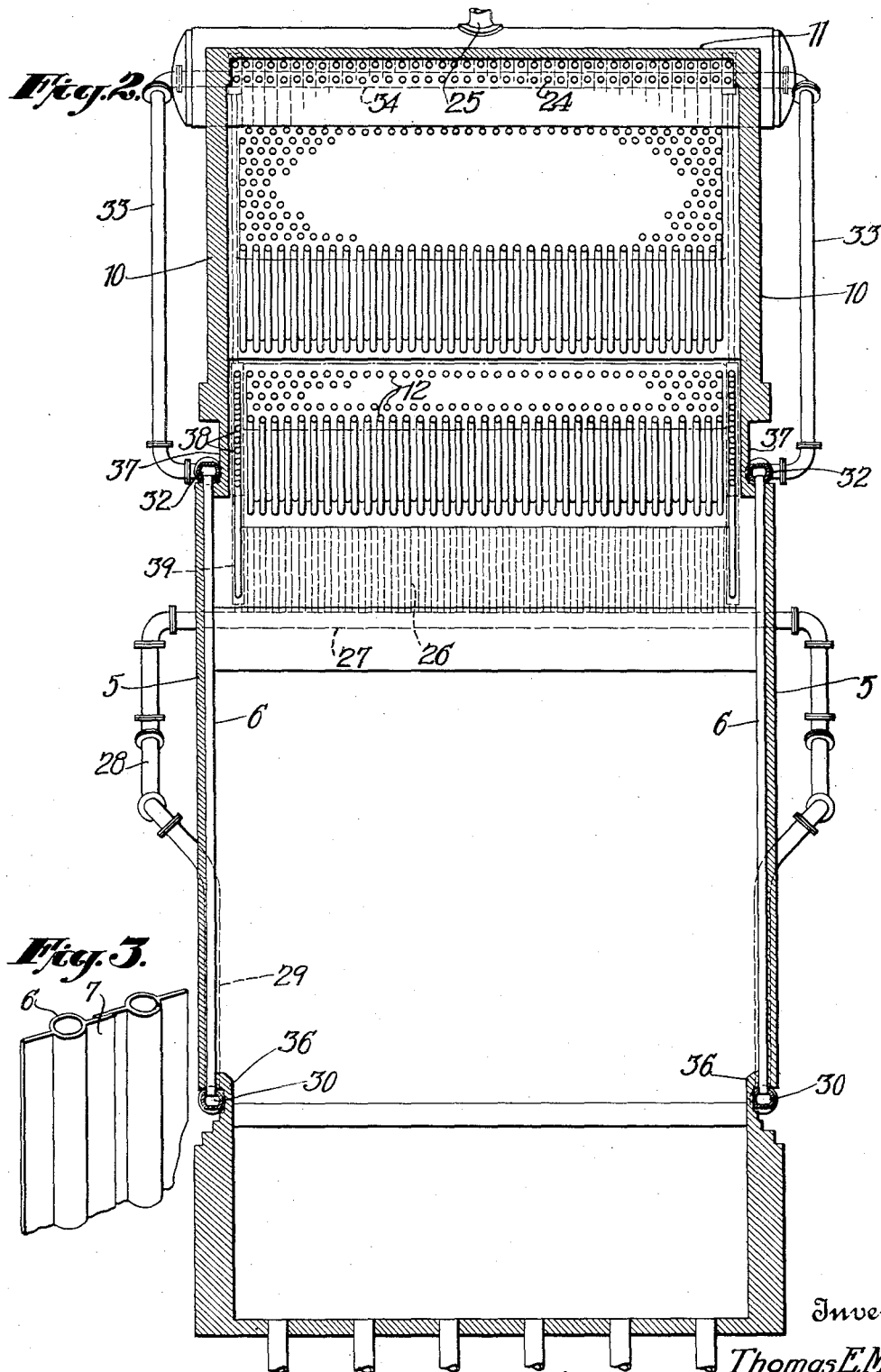
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UNITED STATES PATENT OFFICE.

THOMAS E. MURRAY, OF BROOKLYN, NEW YORK, AND JAY A. FREIDAY, OF EAST ORANGE, NEW JERSEY; SAID FREIDAY ASSIGNOR TO SAID MURRAY.

BOILER.

Application filed June 25, 1925. Serial No. 39,398.

In certain previous applications for patent of Thomas E. Murray (Serial No. 678,443 and others) there are described boilers having within the furnace water walls exposed to the radiant heat of the burning fuel and having above the combustion chamber inclined, approximately horizontal tubes heated by convection from the combustion gases. The present invention is directed particularly to boilers of this kind, and generally to various other kinds of boilers. The accompanying drawings illustrate an embodiment of the invention.

Fig. 1 is a longitudinal vertical section of a boiler.

Fig. 2 is a transverse section of the same.

Fig. 3 is a perspective view of a detail of the tubing.

Referring to the embodiment of the invention illustrated, the furnace has a front wall 1 offset from the tubing and a roof or arch 2 with openings at intervals for nozzle burners 3 which inject powdered coal, oil or gas or similar fuel in jets. The rear wall of the furnace is indicated at 4. The front and rear walls are of substantial thickness to withstand the intense heat. The side walls are made lighter and are composed of vertical tubes 6, preferably of the style shown in Fig. 3 with flanges 7 welded thereto and overlapping in the spaces between the tubes; to the outside of which is applied a coating 5 of refractory material. The upper part of the boiler is mounted in the usual front and rear walls 8 and 9, longitudinal side walls 10 and roof 11. It carries the usual inclined, approximately horizontal, boiler tubes in horizontal rows extending entirely across and forming two banks 12 and 13, superheater tubes 14 and baffles to direct the gases of combustion about the tubes and finally out through the smoke pipe 15.

A steam drum 16 is mounted in the upper front portion of the boiler. Water passes out therefrom through pipes 17, vertical headers 18 for the tubes 13, pipes 19 and vertical headers 20 leading into the tubes 12; the heated water and steam passing from the upper ends of the tubes into vertical headers 21 and 22 connected by pipes 23, and from the upper headers by cross pipes 24 into the drum, the steam passing out of the top of the latter by a pipe 25 and thence by the usual connection to the superheater coils 14.

The circulating system for the water wall

of the furnace takes its water from the headers 20, the water passing therefrom through pipes 26 into a transverse pipe or drum 27 extending across the lower part of the front wall 8 and extended out beyond the side walls as shown in Fig. 2. At its ends it leads into pipes 28 which extend backwardly and downwardly beyond the rear wall and thence down by vertical pipes 29 to the rear ends of headers 30 mounted in the lower parts of the side walls of the furnace and having at their opposite ends valve blowoffs 31. The water from the headers 30 entering the lower ends of the tubes 6 is heated and the hot water and steam pass from the upper ends of these tubes into headers 32 extending along the upper edges of the side walls 5 and connecting at their forward ends with vertical pipes 33 leading into the opposite ends of a header 34 from which are branches 35 leading into the steam drum. The headers 30 and 32 are protected by walls of refractory tile or the like 36 and 37 on their inner faces from the excessive heat of the furnace.

Additional protection is provided for the headers 32 and for the side walls at this junction point between the furnace walls 5 and the upper or boiler walls proper 10 by the introduction of a line of tubes 38 along the inner face of each wall. The lines of tubes 38 extend downward below the tubes 12 and the lower tubes 38 form vertical screens at the sides only; that is, with a clear space between the screens at opposite sides. These tubes for example may be parallel with the approximately horizontal tubes 12 of the regular system and outside of those tubes 12 which are nearest to the side walls. Such a screen of tubes may be used also where there are no headers 32 and in fact where there is no water wall within the furnace, and they may extend over any portion of the side wall which requires protection. With such screens of tubing 38 a circulation may be obtained by means of headers 39 and 40 lying parallel to the outermost headers 20 and 21 respectively. The line of tubes 38 extends below the bank of tubes 12 so as to cover the full length of the headers.

Various modifications of the construction described may be made by those skilled in the art without departing from the invention as defined in the following claim.

What we claim is:

A boiler having a furnace with water walls of vertical tubes and having a bank of horizontal tubes 12 above the furnace, headers for said water wall at the upper end thereof and located at least in part below said bank or horizontal tubes, and supplementary horizontal tubes in lines extending downward below the tubes 12 so as to

form vertical screens at the sides only for 10 screening said headers, with a clear space for the combustion gases between the opposite screens.

In witness whereof, we have hereunto signed our names.

THOMAS E. MURRAY.
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