

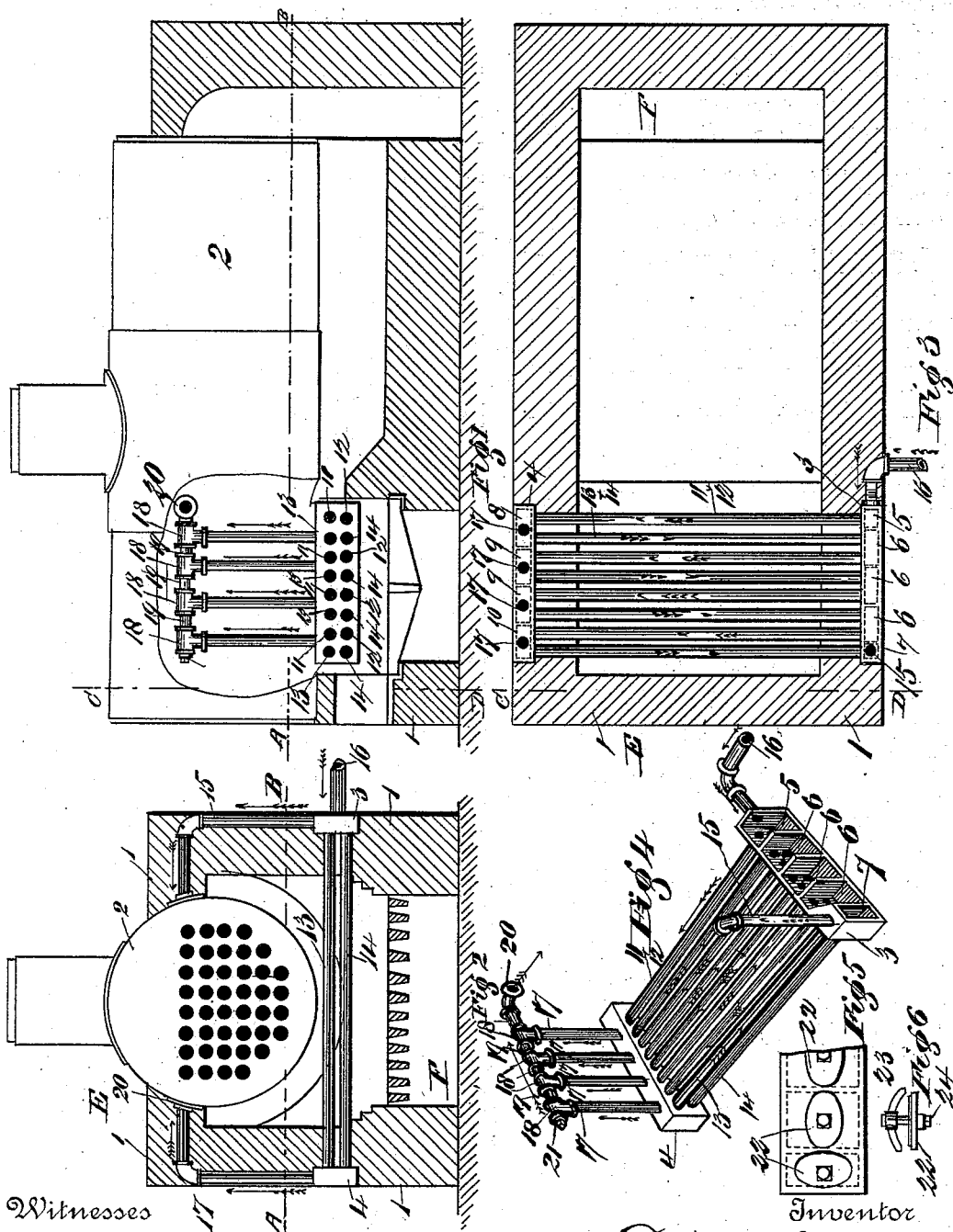
(No Model.)

D. MYERS.

FEED WATER HEATER AND STEAM GENERATOR.

No. 526,841.

Patented Oct. 2, 1894.



Witnesses

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DAVID MYERS, OF NORTH MANCHESTER, INDIANA, ASSIGNOR OF ONE-HALF TO THE MANCHESTER MANUFACTURING COMPANY, OF SAME PLACE.

FEED-WATER HEATER AND STEAM-GENERATOR.

SPECIFICATION forming part of Letters Patent No. 526,841, dated October 2, 1894.

Application filed February 10, 1894. Serial No. 499,707. (No model.)

To all whom it may concern:

Be it known that I, DAVID MYERS, a citizen of the United States, residing at North Manchester, in the county of Wabash and State of Indiana, have invented new and useful Improvements in Feed-Water Heaters and Steam-Generators, of which the following is a specification.

My invention relates to new and useful improvements in feed-water heaters and steam generators, particularly auxiliary steam-generators for steam boilers, and consists in a novel and peculiar arrangement of water circulating and heating pipes and steam conveying stand pipes hereinafter more fully set forth.

The object of my invention is, primarily, to provide a series of water circulating tubes transversely across the furnace of the boiler between the boiler and the said furnace to protect the furnace plates of the boiler from the fierce flames of the furnace that would otherwise impinge against them; and for the purpose of uniformly distributing the heat of the furnace over the exposed heating surface of the boiler; and to provide means whereby the feed-water to be heated will be thoroughly circulated in the circulating tubes, without passing a second time through the same pair of tubes; and to provide means whereby the steam generated in the circulating tubes and collected in the return chambers of the distributing chamber will be conducted into the boiler at or below the water line of the boiler. I attain these objects by means of the arrangement of water circulating and heating tubes illustrated in the accompanying drawings in which similar numbers of reference designate like parts throughout the several views.

Figure 1. is a side sectional elevation of a boiler and its setting taken through the line E. F., see Figs. 2. and 3. and showing my arrangement of feed water heater and steam generator applied thereto. Fig. 2 is a transverse sectional elevation of the same taken through the line C. D. See Figs. 1. and 3. Fig. 3. is a sectional plan of the same taken through the line A—B— Figs. 1. and 2. Fig. 4. is a perspective view of the feed water heater and the steam generator. Fig. 5. is an enlarged de-

tail broken view of a portion of the distributing chamber; and Fig. 6. is a detail view of the hand hole cover and the fastening for securing the same to the distributing chamber. 55

In the drawings the steam generating boiler 1. is set or built in the setting 2. in the usual well known manner.

The apparatus for heating the feed water and generating the steam, to a great extent 60 therefrom, is composed of the end distributing chambers 3 and 4 secured flush with the sides or side walls of the setting, and are each subdivided into a series of distinct and separate compartments 5. 6. and 7. and 8. 9. and 65 10. which I designate return chambers for reasons hereinafter shown. The opposite return chambers are connected directly by the feed water circulating tubes or pipes which are arranged horizontally and transversely across 70 and over the furnace of the boiler 1. close to or almost in contact with the furnace sheet or those lower sheets of the boiler subjected to the direct heat from the flames of the furnace. The circulating tubes are arranged in 75 pairs of upper and lower rows 11. and 12. and 13 and 14. Each of the pairs (as the pipes 11. and 12.) has its influx ends connected with the return chambers 5. and its efflux or discharge ends are connected with the 80 return chambers 8. of the opposite distributing chamber 4. while the next pair of return pipes 13. and 14. has its influx ends connected with the return chamber 8. and its opposite discharge ends or efflux ends connected with the return chamber 6. and so are 85 the remaining circulating tubes arranged to alternately receive and discharge the feed water from their opposite return chambers till the heated water, or the steam generated 90 therefrom, or both, are discharged into the final chamber 7. which is connected to the boiler below the water line thereof by the vertical or stand pipe 15. The feed water is introduced first into the receiving chamber 5. 95 by means of the feed pipe 16. connected to a suitable feeding device as a pump, injector, &c.

On the top of the distributing chamber 4. is arranged series of vertical or stand pipes 100 17, which are separately connected to the distributing or return chambers 8. 9. 9. and 10.

at their bottom ends and have their top ends connected by any suitable pipe connection, but preferably by the T-unions 18. and the connecting nipples 19. to form a continuous top connection between each of the pipes which series of connections is connected to the boiler by the branch pipe and flange piece 20. The end T-union is plugged in the usual manner by the plug 21.

In order that each of the return chambers of the distributing chambers 3. and 4. may be accessible I provide separate hand-holes in connection with each return chamber each of which handhole is provided with the removable cover 22, secured by the saddle 23. and its securing bolt 24.

From the forgoing description the operation of the apparatus will be readily understood and the course of the circulation of the feed water readily seen and further description will be unnecessary.

I am aware that previous to this invention many different kinds of arrangements of feed-water heaters having circulating tubes have been introduced into the main flues or passages through which the heated gases pass and escape to the stack with a view of economizing the fuel by causing the colder feed water to circulate through said pipes to absorb heat from the gases that would otherwise be wasted. These appliances have been found in practice to become coated with soot deposit and soon, either no heat units, or very few heat units, are absorbed by the water from the escaping gases.

It will be observed that, in my arrangement of feed water circulating tubes, the tubes 11. and 12. and 13. and 14 are placed in close proximity to the bottom sheets of the boiler which are the most exposed to the direct and concentrated heat of the furnace. This I do for the purpose of protecting the said sheets from burning and reducing the violence of ebullition at this point of the boiler which oftentimes is the direct cause of the priming of the boiler.

Another feature of great importance resulting from this arrangement of feed water heater and steam generator is that, by such a combination of distributor, a rapid circulation of the feed water is produced in the circulating tubes of the heater and the water and steam generated therefrom is heated to a degree of heat not less than that of the generating boiler thereby producing an equal expansion of the sheets throughout the entire surface of the boiler thereby reducing the tendency to overstraining to rupture of a minimum, and adding to the safety of the boiler.

Having thus fully described the construction and nature of my invention, what I claim

as new and useful, and desire to cover by Letters Patent of the United States therefor, is—

1. In a feed water heater and steam generator, the combination with the side distributing chambers thereof each of which is divided into a series of separate and disconnected compartments the whole formed in one integral piece, water circulating tubes connecting each of the opposite compartments of said distributing chambers, said tubes so arranged that each successive tube circulates the fluid in opposite directions, means for supplying the feed water to one of the end compartments of said distributing chamber, and for connecting the opposite end compartment of said chamber to the boiler, vertical stand pipes connected at their bottom ends to the top sides of the compartments of one of the side chambers a series of pipes connecting the top ends of said stand pipes and a pipe connecting such pipes to the boiler, all substantially as and for the purpose set forth.

2. In a feed water heater and steam generator for steam boilers, the combination with the distributing chambers thereof built longitudinally in and flush with the exterior surface of the side walls of the setting of the boiler, transverse water circulating tubes extending between the boiler and the furnace horizontally, and connecting the opposite distributing chambers, a feed pipe connected to one of said distributing chambers and suitable pipe connections connecting the said distributing chamber with the boiler, substantially as and for the purpose set forth.

3. In a feed water heater and steam generator, the combination with a steam boiler and its furnace setting, of side water distributing chambers extending longitudinally in the side walls of the setting of said furnace and flush with the outer surface thereof, upper and lower circulating tubes connecting said distributing chambers, said tubes so arranged and connected that each successive pair of tubes circulates the fluid in opposite directions, a suitable supply pipe connecting to one end of one of said distributing chambers, a discharge pipe connecting the opposite end of said chamber to the boiler, and suitable steam receiving pipes connected at their bottom ends to said distributing chamber and having their opposite ends connected with the boiler substantially as set forth.

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

DAVID MYERS.

Witnesses:

J. S. ANDREWS.

C. T. NOFTZGER.