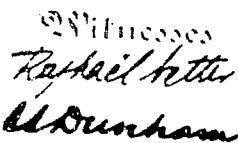
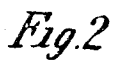


963,732.

Fig.1

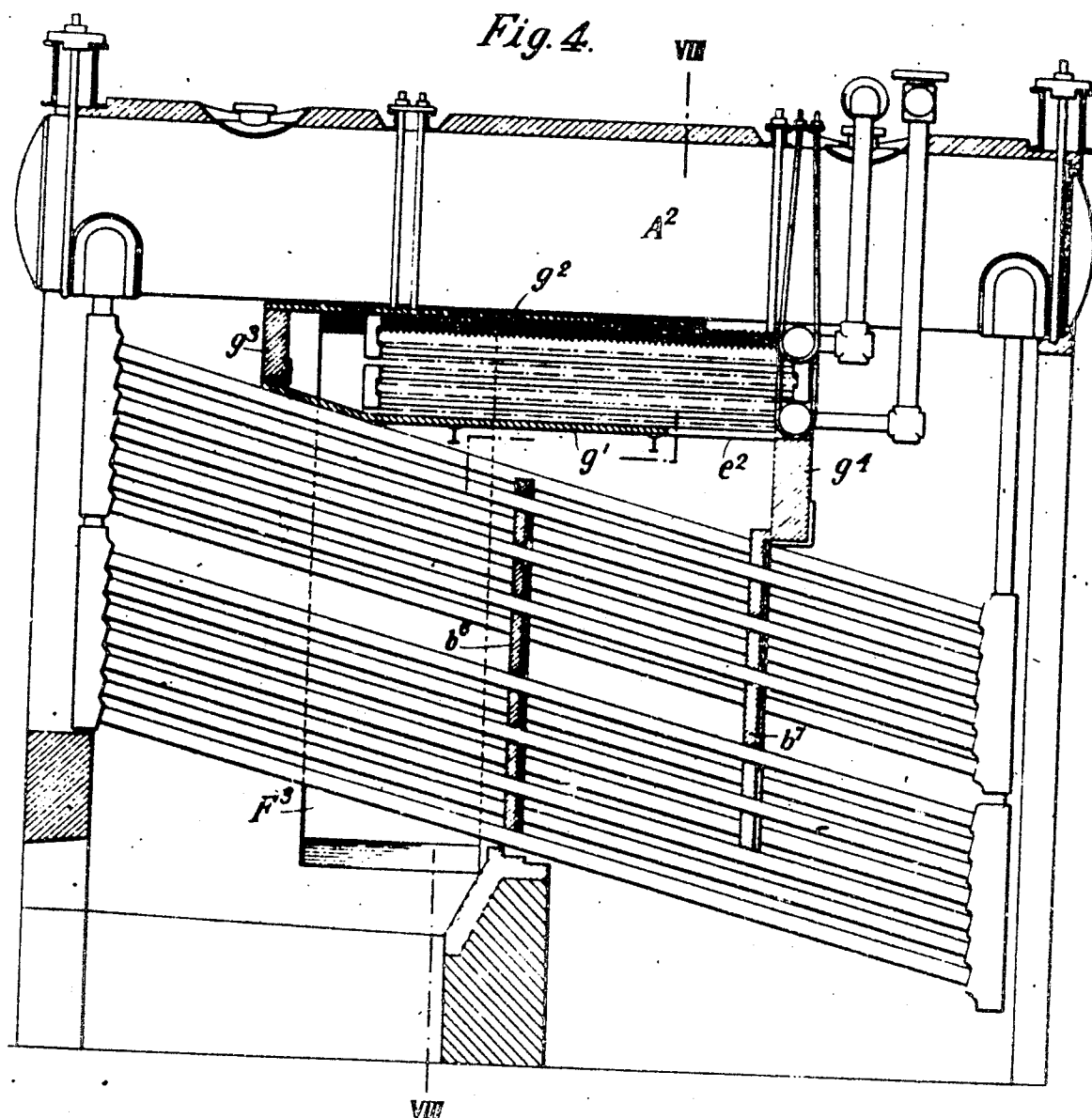


By *his* Attorneys *Ernest H. Foster*
Kerr, Page & Cooper

963,732.

E. H. FOSTER.
STEAM SUPERHEATER.
APPLICATION FILED APR. 13, 1906.

Patented July 5, 1910.
3 SHEETS—SHEET 2.



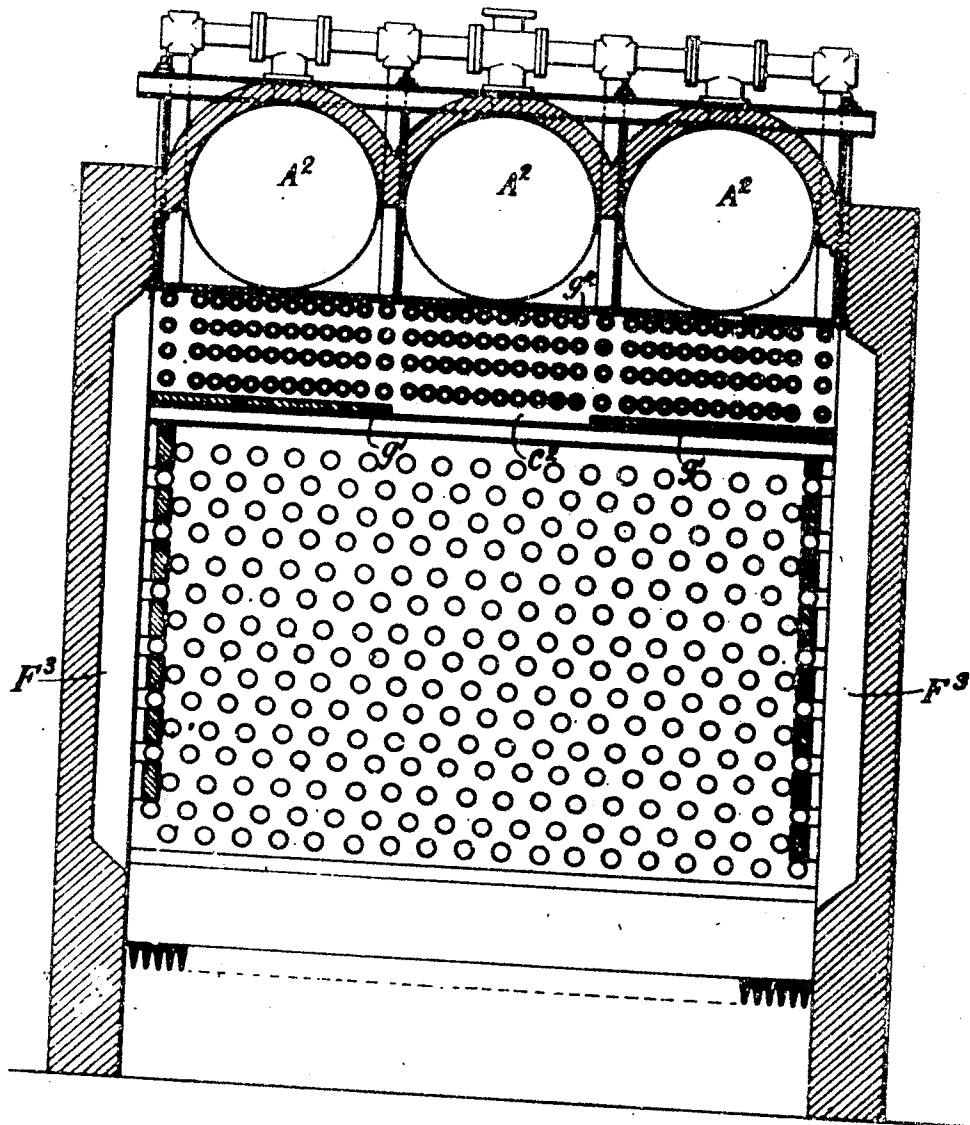
Witnesses
Raphael Heller
Ad. Drunkham

Ernest H. Foster, Inventor
By his Attorneys
New, Page & Cooper

963,732.

Patented July 5, 1910.
3 SHEETS—SHEET 3.

Fig. 5.



Witnesses
Daphiel Pether
A. J. Dunham

Ernest H. Foster, Inventor
By his Attorneys
New. Page & Co.

UNITED STATES PATENT OFFICE.

ERNEST H. FOSTER, OF NEW YORK, N. Y.

STEAM-SUPERHEATER.

963,732.

Specification of Letters Patent.

Patented July 5, 1910.

Application filed April 13, 1908. Serial No. 311,444.

To all whom it may concern:

Be it known that I, ERNEST H. FOSTER, a citizen of the United States, residing at New York, in the county of Richmond and State of New York, have invented certain new and useful Improvements in Steam-Superheaters, of which the following is a specification, reference being had to the drawings accompanying and forming part of the same.

In a certain class of superheaters the hot gases from the fire box are brought directly to the superheater chamber, in order that as little of the heat as possible may be abstracted from said gases before reaching the superheater.

My present invention is an improvement in devices of this general class and in its preferred form consists in the provision of fines or passages preferably located in the side walls of the boiler setting for conducting the superheating gas from the furnace to one end of the superheater chamber, and in the arrangement of a direct passage of communication from the opposite end of the superheater chamber to a point between a part of the boiler and the chimney, whereby the natural draft is made available to carry uncooled gases through the superheater chamber in a more effective manner than has heretofore been accomplished by the devices in use.

The invention involves also other details which will be described by reference to the annexed drawing.

Figure 1 is a side elevation of a water tube boiler, the setting being in section, showing a superheater section and the flue or passage for conveying to it hot gases from the furnace. Figs. 2 and 3 are cross sections on lines II.—II. and III.—III., respectively, of Fig. 1. Fig. 4 is a side elevation of another type of water tube boiler, showing the superheater and one of the flues therefor. Fig. 5 is a section on line VIII.—VIII. of Fig. 4.

Referring now more particularly to Figs. 1, 2 and 3, I indicates the drum of the boiler. Depending therefrom are the water legs a, a' , between which are the water tubes a'' . B is the furnace grate, and above the same, extending rearwardly from the front water leg a , is a baffle plate b , located above the lowermost series of water tubes. Extending forwardly from the rear leg a' , above the uppermost series of tubes, is a baffle b' . The

course of the furnace gases is therefore rearward under the drum A to the stack opening B'. The boiler is mounted in the usual setting, having side walls C, C', a rear end wall C², and front wall C³, the latter having the customary opening c for the furnace door. The superheater is constructed in two sections or parts, mounted on opposite sides of and about on a level with the drum A. One of the superheater sections is shown at S. The superheater sections are inclosed by suitable brick or tile work, as s , and are supported by hangers k of U-shape depending from cross beams s' extending transversely over the drum A. At the forward ends of the superheater chambers are hinged closers s^2 , by which the superheater sections may be conveniently reached for cleaning, etc. One set of the front headers is connected with a pipe i , carrying steam to them from the drum A, while the other set of front headers is connected with an outlet pipe i' , to deliver the superheated steam to the service main, connected to the coupling i^2 . Beginning at a point to the rear of the grate B below the baffle b , and extending vertically to and discharging into the superheater casing or setting, is a flue or passage F. This flue is open to the furnace below the baffle b , so that it will receive gases of very high temperature. The gases received by the flue are carried thereby into the superheater chamber at the rear end thereof, and pass forward through the chamber to the exit opening e , from which they flow into the current of gases to the stack. The superheater is thus supplied with gases of high temperature, no matter how much heat the boiler may take from the current passing around the tubes and baffle plates. The superheater flue is preferably made in the side wall of the boiler setting, a flue being provided for each superheater section, as shown clearly in Figs. 2 and 3. For the purpose of regulating the flow of gases through the superheater chambers, the outlet openings thereof may be provided with dampers, one of which is shown at d , operated in any convenient way, as by a rod d' extending outside of the setting.

In the arrangement illustrated in Figs. 4 and 5, the superheater is located close to the drums A², so as to leave sufficient space above the vertical baffle b^2 for the free passage of the furnace gases. The superheater is inclosed by a bottom plate g' , a top plate

5 g^2 , and a front end-wall g^3 . The top and bottom plates extend from side to side of the boiler setting, and rearwardly to the cross wall g^4 , in and by which the rear headers of the superheater are supported. At the center of the rear end of the bottom plate is an exit opening e^2 . As in the case just described above, the superheater flues F^2 extend from the rear of the grate and discharge into the forward end of the superheater casing. The hot gases then flow rearwardly and escape through the outlet opening c^2 , where they join the furnace gases flowing downwardly between the vertical baffles b^2 and b^1 . In this case also, the flow of gases may be controlled by one or more dampers, not shown.

20 Numerous other embodiments of the invention might be illustrated, but those already described are sufficient to show clearly the essential principle of the invention, whereby the superheater is supplied with furnace gases which have given up substantially none of their heat to other elements of the plant.

25 It will be clear to the skilled engineer who undertakes to apply my invention in practice that it may be utilized in a great variety of ways without departure from its proper scope.

What I claim is:

30 1. The combination with a boiler setting and furnace, and a water tube boiler having its water tubes arranged in the path of the furnace gases flowing through said setting, of a superheater located above the water-tubes, and one or more flues or conduits in the side walls of the setting, extending from the furnace and discharging hot gases therefrom upon the superheater, as set forth.

2. The combination with a boiler setting and furnace, and a water-tube boiler having its water tubes arranged in the path of the furnace gases flowing through the setting, of a superheater casing within the setting and above the water tubes, and one or more flues or conduits in the side walls of the setting, extending to the said casing from the furnace, said casing having an outlet opening arranged to discharge into the current of gases flowing through the setting, as set forth.

3. The combination with a boiler setting and furnace, and a water tube boiler having its water tubes arranged in the path of the furnace gases flowing through the setting, of a superheater chamber in proximity to a side wall of the setting and above the water tubes, a superheater inclosed by the chamber, and one or more flues in the said side wall of the setting extending upwardly from the furnace and discharging hot gases therefrom upon the superheater, as set forth.

4. The combination with a boiler setting and furnace, and water tube boiler having its water tubes arranged in the path of the furnace gases flowing through said setting, of a superheater located above the water tubes, a casing inclosing the superheater, and one or more flues or conduits in a side wall of the setting, extending from the furnace to one end of the casing, said casing having an outlet opening at its other end arranged to discharge into the current of gases flowing through the setting.

ERNEST H. FOSTER

Witnesses:

M. LAWSON DYER,
 S. S. DUNHAM.