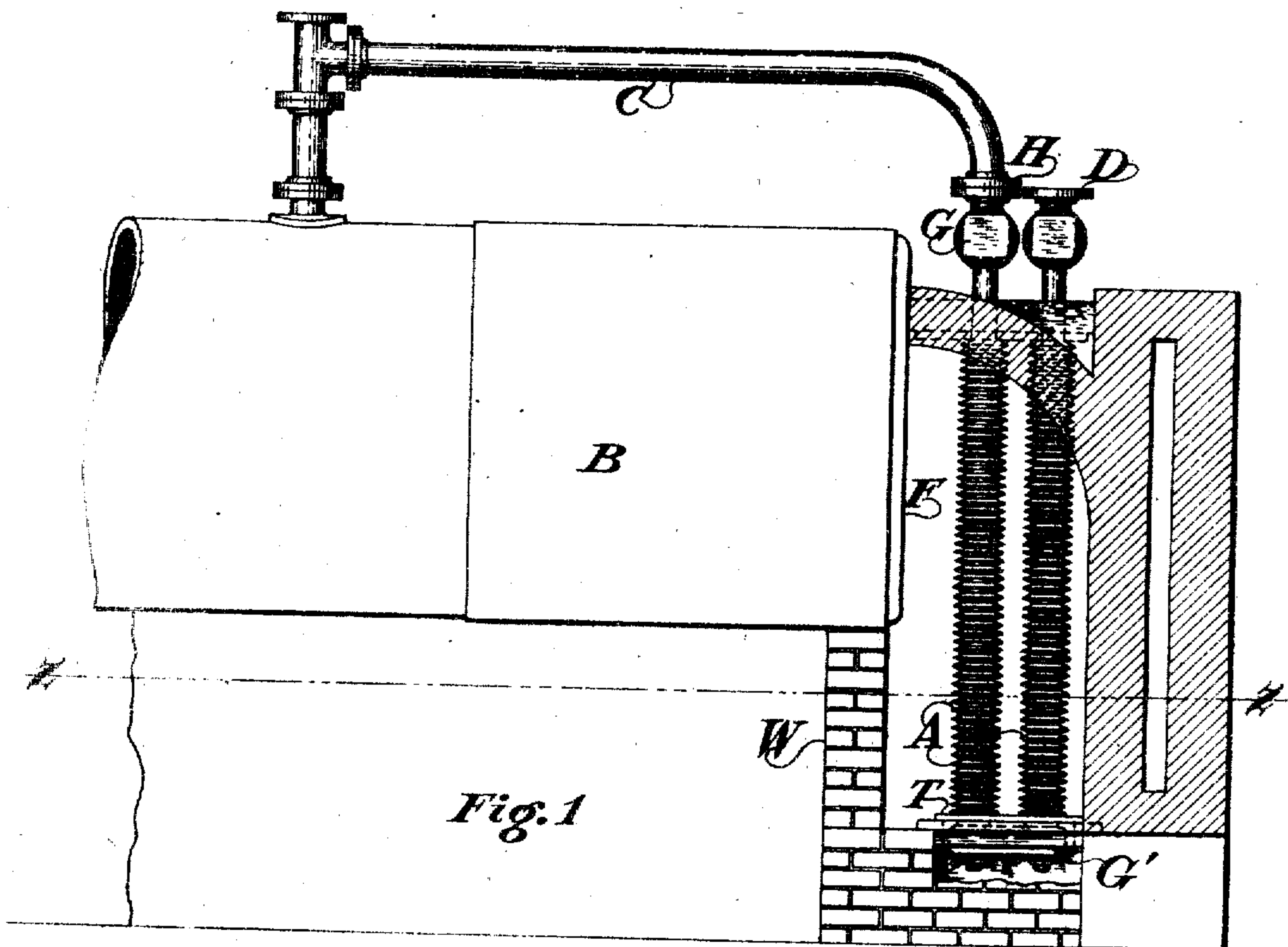
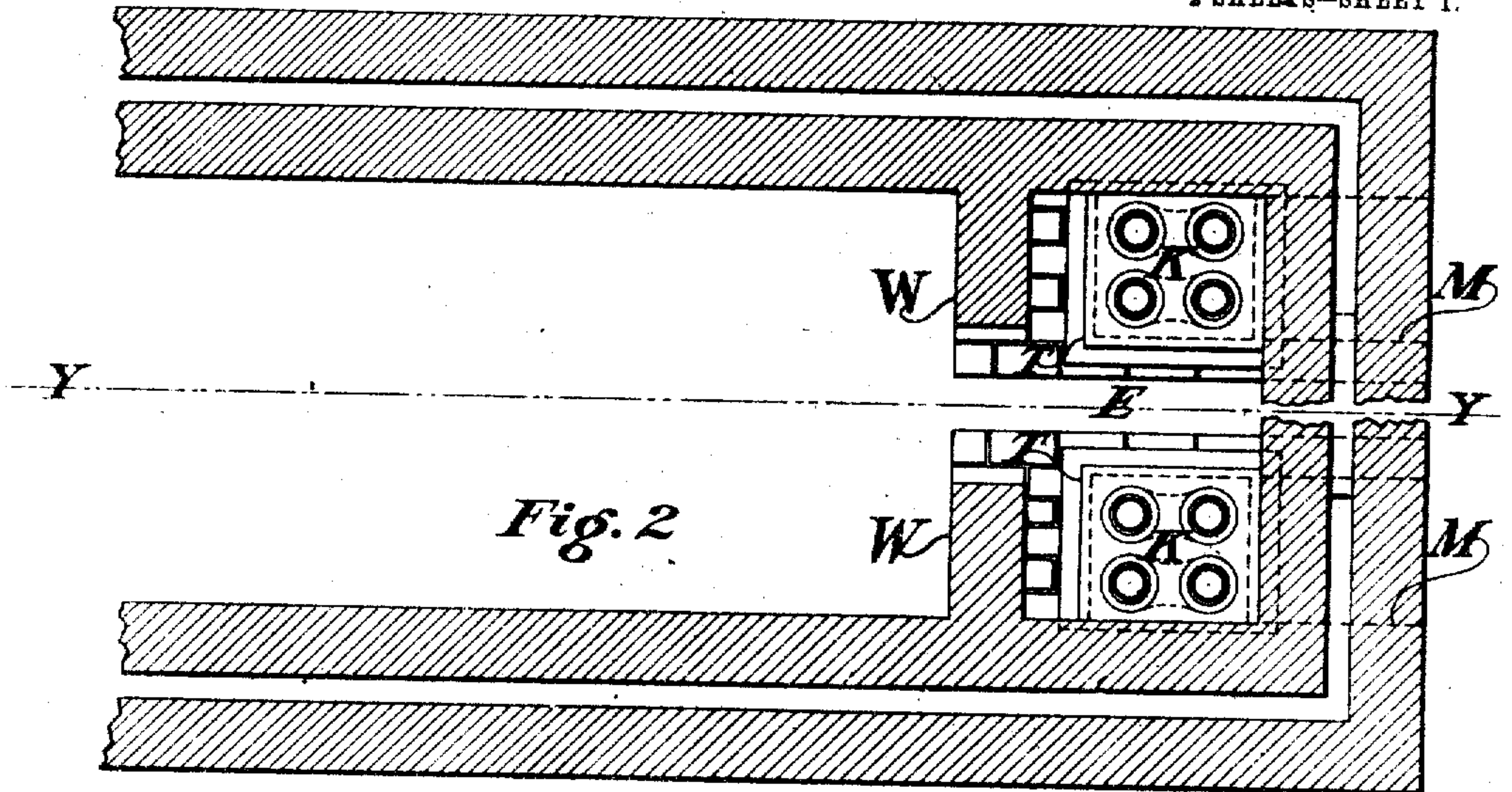


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APPLICATION FILED SEPT. 29, 1905.

Patented Feb. 23, 1909.

2 SHEETS—SHEET 1.



WITNESSES:

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2 SHEETS—SHEET 2

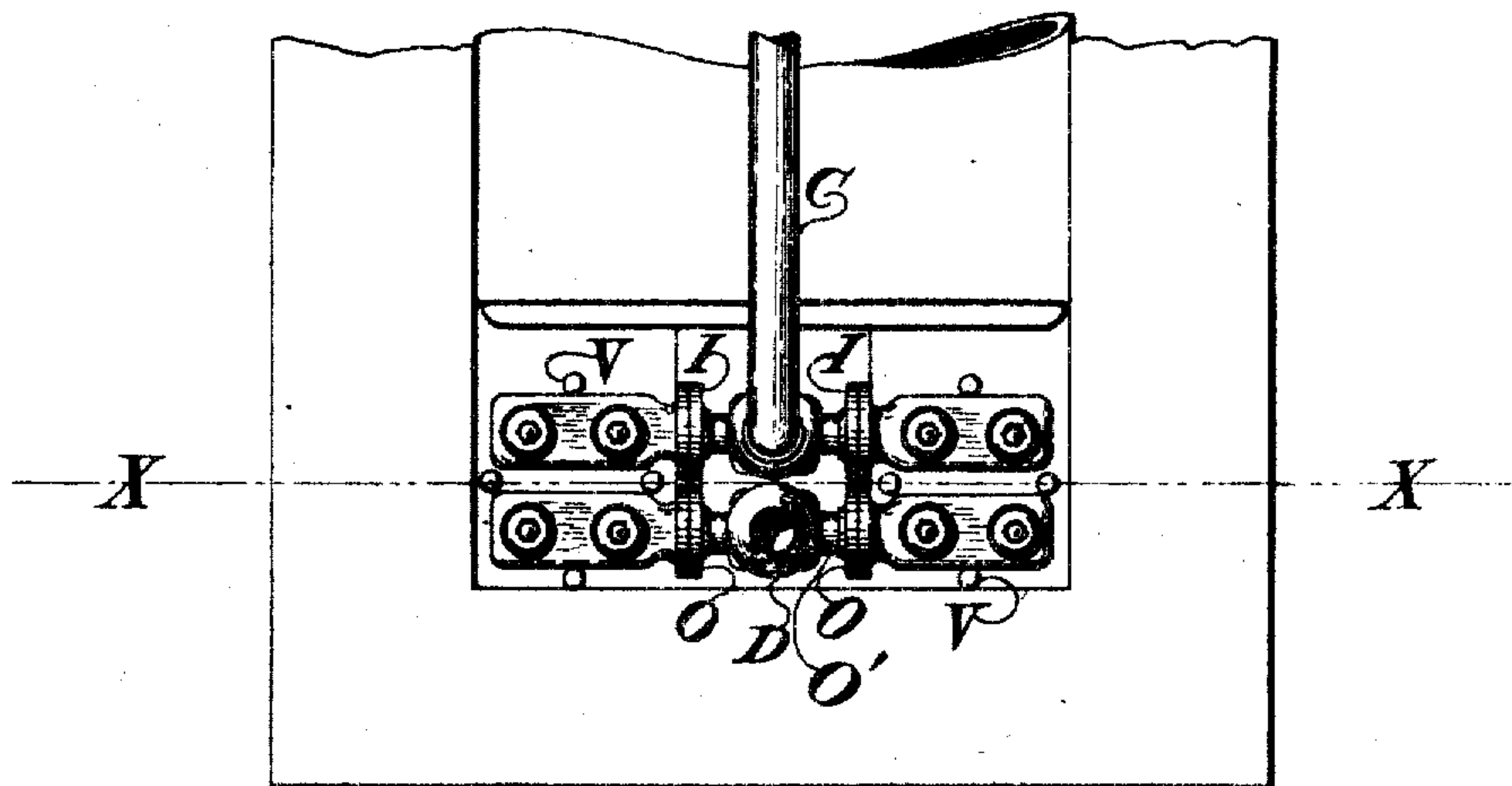


Fig. 4

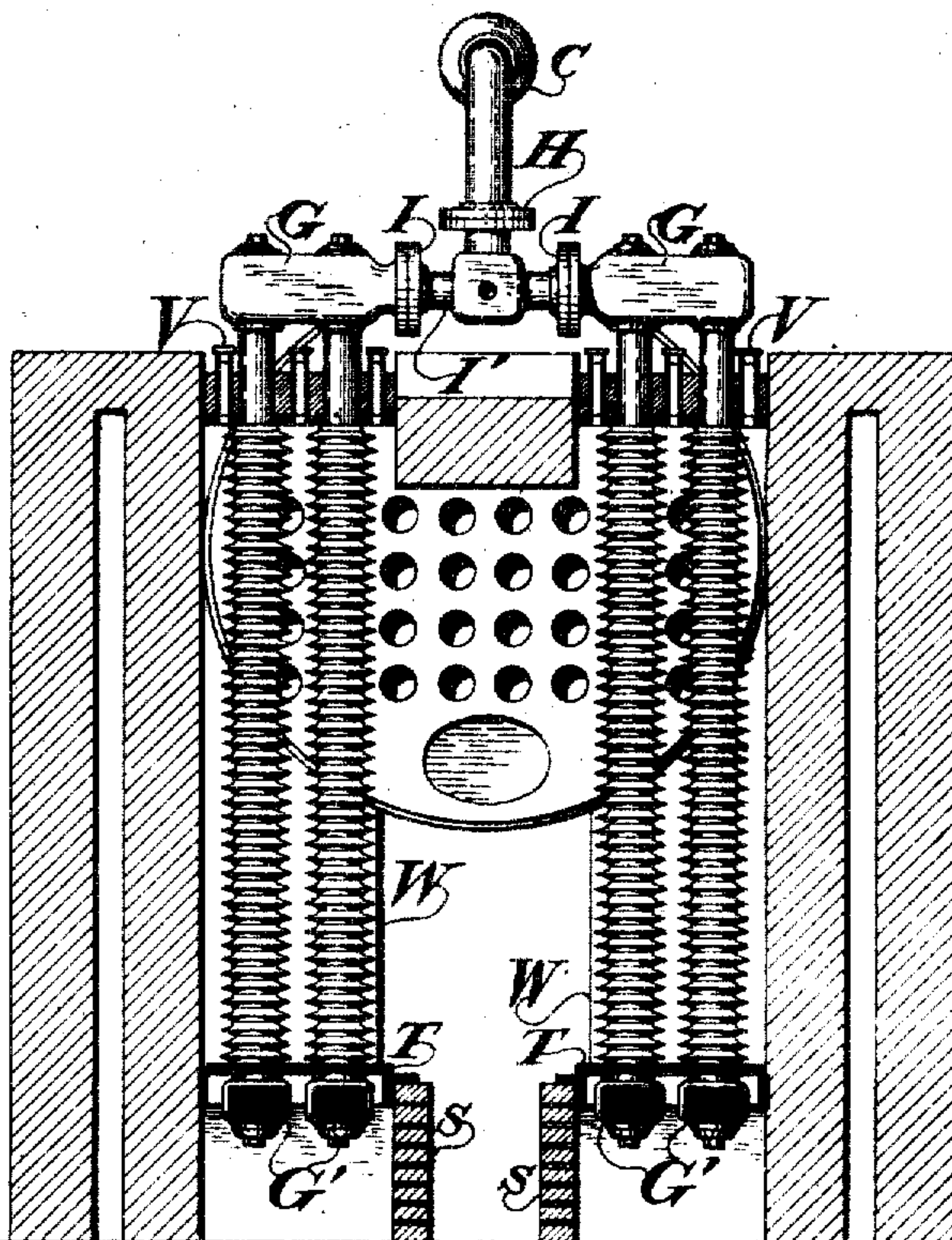


Fig. 3

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STEAM-SUPERHEATER.

No. 913,277.

Specification of Letters Patent.

Patented Feb. 23, 1909.

Application filed September 29, 1905. Serial No. 280,684.

To all whom it may concern:

Be it known that I, ERNEST H. FOSTER, a citizen of the United States, residing in 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 drawing accompanying and forming part 10 of the same.

My invention relates to the superheating of steam, more particularly in connection with a boiler of the so-called "return tubular" type, but embraces features applicable 15 to other generating plants as well.

In carrying out my invention I provide a superheater composed of two sets of vertical pipes, the sets being spaced a short distance apart, located in the rear combustion chamber of the generating apparatus. At the 20 top the two sets are connected by an inlet pipe, at the center of which the steam from the boiler is admitted, so as to divide and flow laterally to the two sets or groups of superheating pipes. The delivery pipe, from 25 which the superheated steam is delivered to the service pipe, also connects the groups of tubes at the top, and is connected with the service pipe at the center. The course of the steam from the boiler to the service main 30 therefore divides in the superheater supply pipes, passes through the parallel groups of vertical tubes and then unites again in the delivery pipe.

35 The superheater is, as before stated, located in the rear combustion chamber of the boiler. One group or set of pipes is located at one side of the said chamber and the other set at the other side. The space 40 between the two groups provides an opening through which the gases of combustion have practically free passage to the flues above. From the sides of the boiler casing wing walls extend over the superheater 45 tubes in the path of the furnace gases, and protect the former from the destructive effects of the direct impingement of the latter. At the same time the narrowing of the passage by the wing walls causes a con- 50 centration and commingling of the hotter and cooler gases at that point, with considerable acceleration of speed. The wing walls also serve to deflect soot and ashes toward the center, where such as is not 55 burned by the blow-pipe effect at this point

or swept out by the strong draft is readily accessible for removal.

For a more detailed explanation reference may now be had to the accompanying drawings, in which is shown the preferred em- 60 bodiment of the invention.

Therein, Figure 1 is a longitudinal section on line Y—Y, Fig. 2, showing the boiler inside elevation. Fig. 2 is a horizontal section on line Z—Z, Fig. 1. Fig. 3 is a 65 transverse section on line X—X, Fig. 4, and Fig. 4 is a top plan view of the rear end of the boiler and setting, showing the superheater in position.

As before stated, my invention is de- 70 signed more particularly for a "return tubular" boiler, that is, one in which the flames and gases pass under the boiler to the rear, then up to the flues, through the latter to the smoke chamber and stack at 75 the front of the boiler. Such an arrangement is shown in the drawings, the boiler itself being designated by B, and its rear end by F. At this end is the rear combustion chamber, extending transversely 80 across the boiler. Located in the chamber is the superheater A, consisting of two groups, K, of vertical pipes, one group or section located at one side of the chamber 85 and the other group or section at the other side, with an open space between them, as previously explained. From this open space the superheater pipes or elements and adja- 90 cent parts of the boiler and setting are readily accessible for inspection and repair.

In the present embodiment of the inven- 95 tion there are four pipes in each group. The forward pair of each group is connected to a suitable transverse header, as G, secured by flange joints I to the inlet pipe I', at the 100 center of which the supply pipe C is connected by a flange joint H. The latter pipe connects with the boiler, to receive steam therefrom. At the bottom each pipe of the forward pairs is connected to its neighbor in 105 the rear pair by a longitudinal header, as G'. The rear pairs are connected to transverse headers like those of the forward pairs, secured by flange joints, O to the outlet or delivery pipe O', which may be connected 110 by a flange D at its center to the service main.

Flowing from the supply pipe C, the steam enters the inlet pipe I' and divides to right and left, thus passing to the forward pairs of 110

the sets of tubes. At the latter each stream divides, half passing through one tube and half through the other, down to the bottom headers and up the rear tubes to the top headers in which the four streams unite in two, which latter unite in the outlet pipe O' and finally enter the service pipe together.

In front of the two groups of tubes, below the boiler, are the wing walls or piers W, W. These serve both to support the rear end of the boiler and also to protect the superheater tubes from the direct impingement of the furnace gases. The superheater groups or sets are provided with bottom plates T, T, which are supported by low walls S, S, extending rearwardly from the wings or piers W, W, forming pockets closed to the combustion chamber but readily accessible by means of doors, not shown, which may be located at M, M, Fig. 2. The furnace gases, passing to the rear under the boiler, strike the wings W, W, and are directed to the central passage E, from which part of the stream of gases is diffused among the superheater elements, although the main body of the stream flows uninterruptedly between the two sections or groups.

For the purpose of cleaning the pipes the openings V are provided in the top of the setting. Through these apertures jets of steam may be injected, to blow off accumulations of soot.

It is to be understood that the mere details of construction herein specifically shown are immaterial, and that the invention may be embodied in a variety of different forms without departure from its proper scope.

What I claim is:

1. The combination with a boiler and a structure inclosing the same, said structure including parallel walls, of a vertical wall or partition extending from one of said walls and terminating short of the other of said walls to provide a chamber in said structure in rear of the boiler, and a flue space, and a superheater located in said chamber behind

said partition or wall and to one side and away from the flue space so as to be out of the direct path of the furnace gases but to be subjected to the heat thereof.

2. The combination with a boiler and a structure inclosing the same, of a chamber formed in said structure in rear of the boiler, said chamber being separated from the boiler by partitions or wings spaced apart from each other to permit passage of the furnace gases, and a pair of superheaters arranged in said chamber, said superheaters being located one behind each of said partitions whereby said superheaters are protected from the furnace gases, said superheaters being separated by a space alining with the one between the wings to provide for the free passage of the gases, and means to feed steam from the boiler to said superheaters.

3. The combination with a tubular boiler, of a combustion chamber at the rear end thereof, a superheater in the chamber, composed of two sections one located at each side of the chamber, and wing walls extending inwardly from the boiler setting in front of the superheater sections to protect the latter from the direct impingement of the furnace gases, as set forth.

4. The combination with a boiler and a structure inclosing the same, of a chamber formed in said structure in rear of the boiler, said chamber being separated from the boiler by partitions or wings spaced apart from each other to permit passage of the furnace gases, and a pair of superheaters arranged in said chamber, said superheaters being located one behind each of said partitions or wings whereby said superheaters are protected from the direct action of the furnace gases, and means to feed steam to the superheaters.

ERNEST H. FOSTER.

Witnesses:

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JOHN C. KERR.