No. 806,169. PATENTED DEC. 5, 1905.

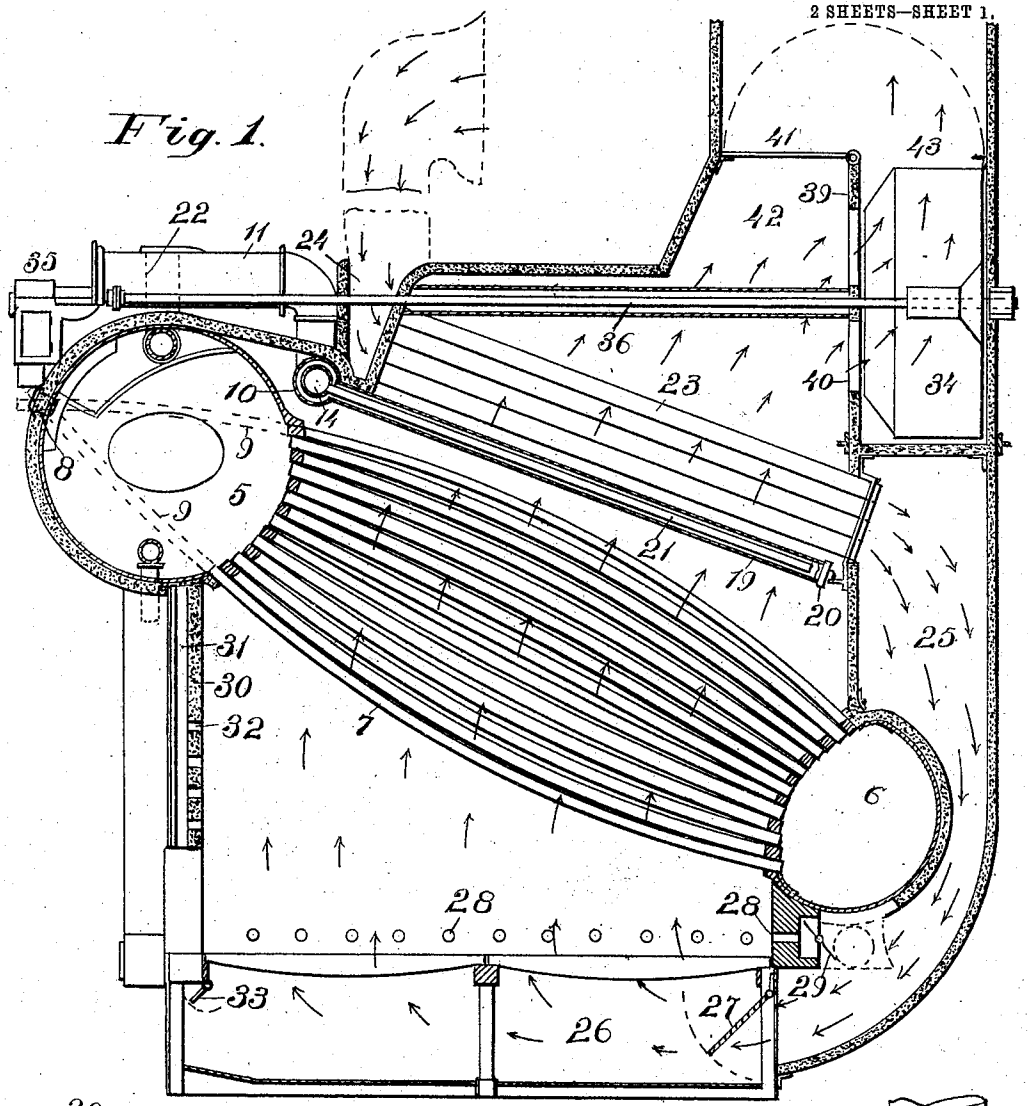
C. D. MOSHER.

SUPERHEATER.

APPLICATION FILED JULY 17, 1903.

2 SHEETS—SHEET 1.

Fig. 1.



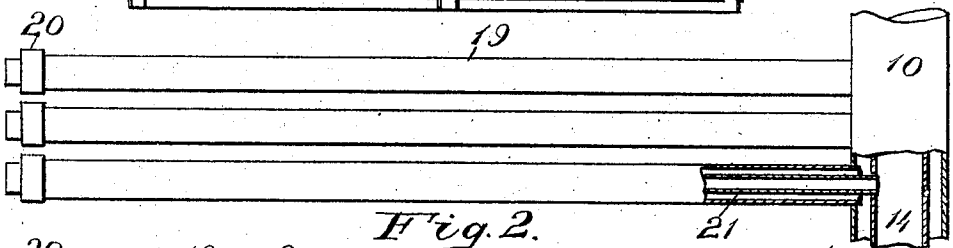


Fig. 2.

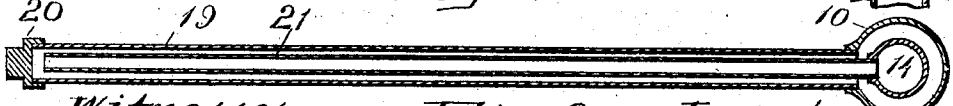


Fig. 3.

Witnesses:
L. Maine
Wm A. Saunders

Inventor:
C. D. Mosher,
By E. G. & A. J. Siggers
Atty's

No. 806,169. PATENTED DEC. 5, 1905.

C. D. MOSHER.

SUPERHEATER.

APPLICATION FILED JULY 17, 1903.

2 SHEETS—SHEET 2.

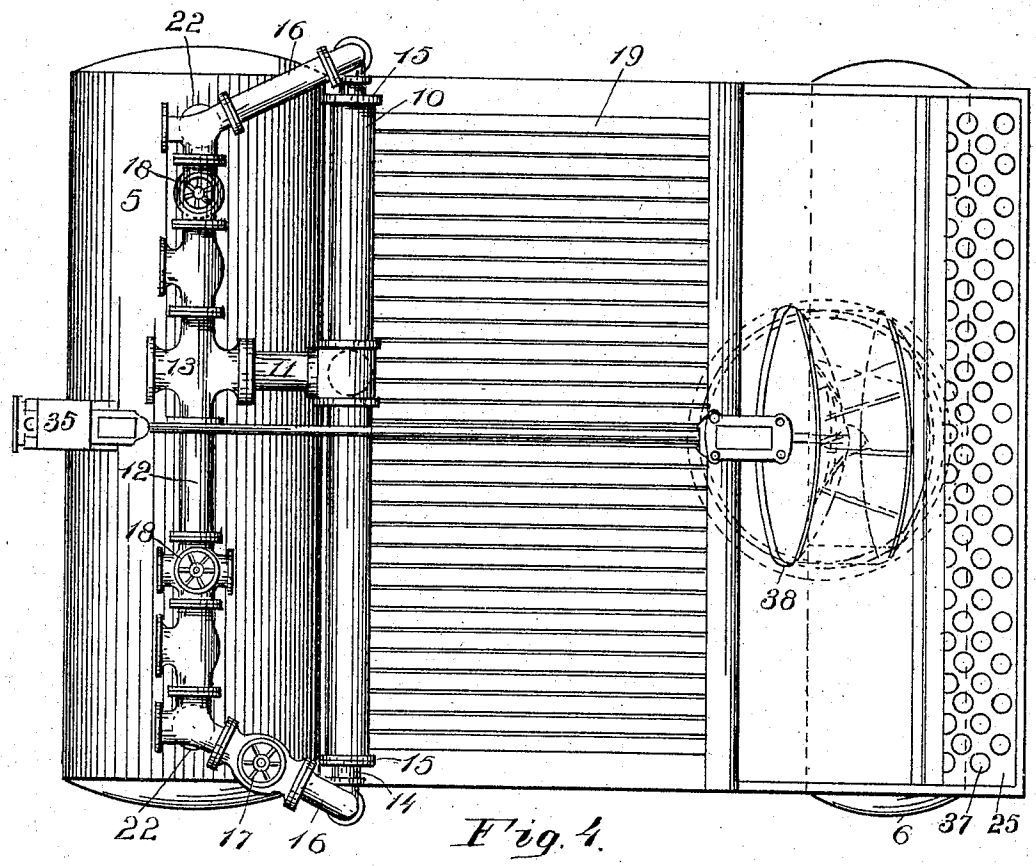


Fig. 4.

Witnesses:
L. Mann
Wm A. Saunders

Inventor:
C. D. Mosher.
By J. S. & A. J. Zerbe
Attys.

UNITED STATES PATENT OFFICE.

CHARLES D. MOSHER, OF NEW YORK, N. Y.

SUPERHEATER.

No. 806,169. Specification of Letters Patent. Patented Dec. 5, 1905.

Application filed July 17, 1903. Serial No. 166,054.

To all whom it may concern:

Be it known that I, CHARLES D. MOSHER, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Water-Tube-Boiler Superheaters, of which the following is a specification.

The object of this invention is to provide a superheater for steam-boilers, and it has special reference to the manner in which the same is constructed and utilized in water-tube boilers whereby the greatest efficiency may be obtained by the heat from the combustion-chamber without impairing the generating qualities of the boilers' tubes, as will now be set forth in detail.

In the drawings, Figure 1 is a vertical longitudinal section of a boiler supplied with the improvement in superheaters. Fig. 2 is a top view, partly in section, of portions of the superheating-tubes; Fig. 3, a side elevation of one of the superheating-tubes with the supply and exhaust tubes; and Fig. 4, a top view of the boiler with the upper portion of the casing and the air-supply tubes removed, showing the relative arrangement of the superheaters.

In the construction of my invention I employ the well-known type of water-tube boiler, in which—

5 represents the steam-drum, 6 the water-drum, and 7 the generating-tubes connecting these drums, the tubes being so arranged that they can be withdrawn through the plug-holes on the forward side of the steam-drum. In Fig. 1 I show one of the plugs 8, with dotted lines 9 illustrating the manner in which the tubes are directed toward and drawn out through said holes.

Directly above the generating-tubes and substantially on the same angle are the steam-superheating tubes, which comprise a transverse tube 10, connected centrally with a pipe 11, which joins a horizontal pipe 12 above the steam-drum 5 by means of a cross connection 13 and from which steam is supplied to the engine. Within the transverse tube 10 is a smaller tube 14, secured in heads 15 in the ends of the tube 10, which inner tube has pipe connections 16 with the ends of the horizontal pipe 12, a valve 17 being placed in one or both of the pipes 16. A valve 18 may also be placed in the horizontal pipe 12 on each side of the connecting-pipe 11, so that the superheater may be cut out entirely, if desired. By reference to Figs. 2 and 3 it will be seen that the outer tube 10 has a series of tubes 19 projecting therefrom, the lower end of each tube being provided with a screw-cap 20. The inner tube 14 has smaller tubes 21 secured therein, so that they rest within the outer tubes 19, extending down to a point near the caps 20, terminating in open ends. The object of the pipes thus arranged is to form a thin space around the inner tube for the steam to pass, and as the outer tubes 19 are directly in the path of the escaping gases from the combustion-chamber the steam will thus be more positively subjected to the heat than if it merely passes through pipes in the ordinary manner. As the horizontal pipe 12 is connected with the steam-space of the boiler at its ends by the vertical pipes 22, it is obvious that the steam from the boiler will pass up through the pipes 22, thence through the connections 16 and inner tube 14, and be distributed through the tubes 19, and after passing up through these tubes and being discharged into the outer tube 10 will pass up into the tube 11 and be conducted to the engine. Directly above these superheating-tubes is a plurality of air-tubes 23, having an air-inlet 24 at their upper ends and a chamber 25 at their lower ends. This chamber extends along the rear end of the boiler and down around the rear side of the water-drum 6, connecting with the rear end of the ash-pit 26, a door 27 being provided at this point, so that the quantity of air supplied may be regulated. Air-holes 28 are also provided through the rear and side walls of the combustion-chamber with regulating-doors 29, and by means of which all the air to the combustion-chamber may be supplied, as desired, from the rear air-chamber. The front wall 30 of the combustion-chamber is made hollow, as at 31, and provided with inlet-holes 32, whereby air may be furnished to the combustion-chamber above the fuel-bed, and regulating-doors 33 are also arranged to control the supply.

In Fig. 1 I show a suction-fan 34 located directly above the rear air-chamber 25, this fan being driven by means of an engine 35 on the forward end of the shaft 36.

It is not essential to the invention that the air-inlet tubes 23, as in Fig. 1, should be located above and parallel with the superheating-tubes 19, but instead thereof they may be placed vertically within the air-space 25—as shown, for instance, in Fig. 4—where the open upper ends of the air-tubes 37 are represented. In this instance the suction-fan 38 may be lo-

cated forward of the vertical air-tubes 37; but in either case the air is drawn through the system substantially as shown by the darts.

In Fig. 1 the suction-fan rests behind a dividing-wall 39, through which is an aperture 40, and above the fan is a damper 41, hinged to and in line with the wall 39 and adapted to swing in such manner as to close the free aperture 42 above the air-tubes 23 or channel 43 above the fan.

Where natural draft is employed, the damper is thrown over, closing the channel 43, so the product of combustion will not pass through the fan; but when the fan is used the damper is thrown to the position indicated in Fig. 1.

With this arrangement and construction of the superheaters I am able to utilize a greater share of the escaping heat than by other forms heretofore employed, and, furthermore, such tubes may be used without enlarging the structure, and they are so located that they can readily be examined or repaired.

What I claim as new is—

1. In a steam-generator, a steam and a water drum connected together by a plurality of generating-tubes, in combination with a superheater above said tubes comprising a transverse pipe along the steam-main and connected therewith intermediate its ends, a series of open-ended tubes projecting therefrom rearwardly and substantially parallel with the generating-tubes below the top casing of the generator a pipe inclosing said transverse pipe also connected with the steam-main, having tubes with closed ends surrounding said open-ended tubes.

2. In a steam-generator an outer pipe centrally connected with the steam-discharge with a plurality of projecting tubes closed at their outer ends, in combination with a head at each end, an inner pipe passing through the heads of the outer pipe and connecting with a steam-supply, and provided with small open-ended tubes within the aforesaid projecting tubes, as set forth.

3. In a steam-generator the combination of a steam and a water drum connected together by a plurality of generating-tubes, a transverse pipe across the generating-tubes connected with the steam-discharge pipe having a head at each end and a plurality of projecting tubes with closed ends extending along parallel with the generating-tubes, a pipe within the transverse pipe having tubes which rest within the aforesaid projecting tubes, said pipe being secured through the heads of the outer pipe and connected with the steam-supply pipe from the steam-drum, and valves for controlling the supply of steam to said superheater, as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES D. MOSHER.

Witnesses:
THOMAS W. MORRISON,
WILLIAM MOLLOY.