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B. BROIDO.
SUPERHEATER.
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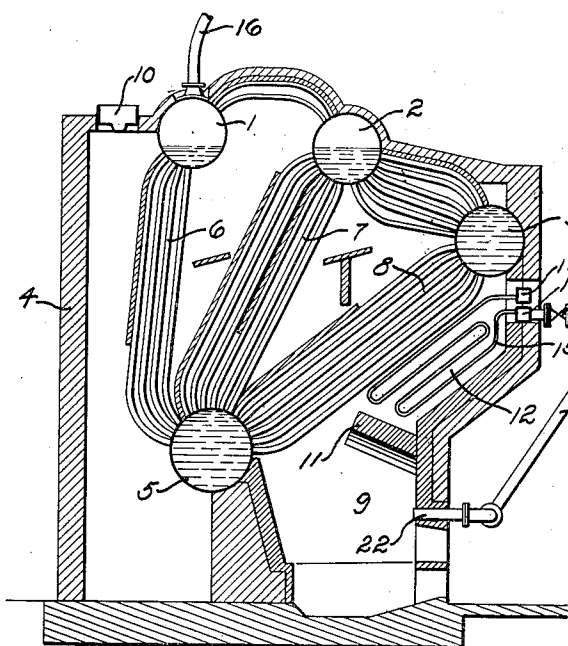


Fig. 1.

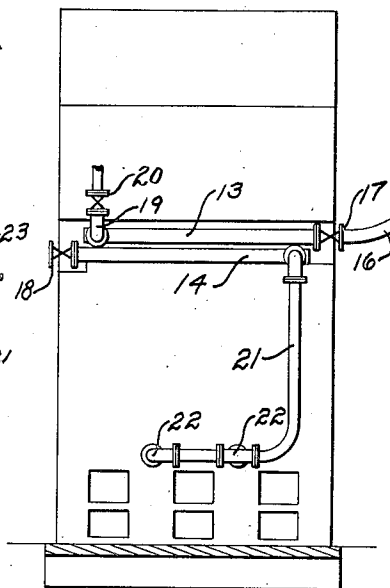


Fig. 2.

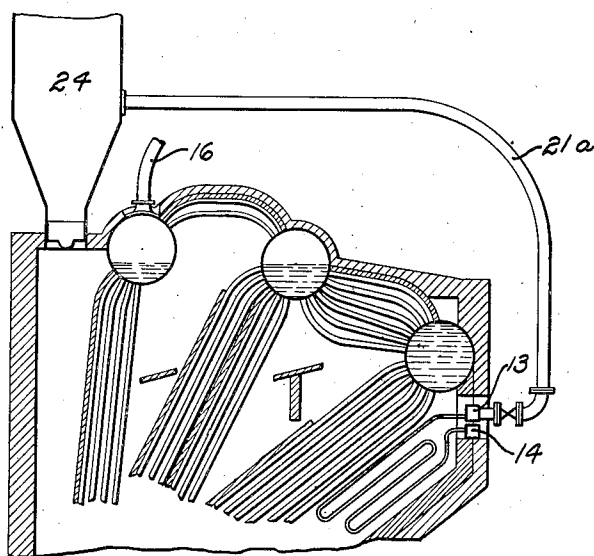


Fig. 3.

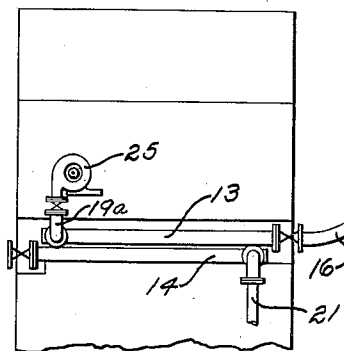


Fig. 4.

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By H/S Attorney O. V. Thiele

UNITED STATES PATENT OFFICE.

BENJAMIN BROIDO, OF NEW YORK, N. Y., ASSIGNOR TO THE SUPERHEATER COMPANY,
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SUPERHEATER.

Application filed June 14, 1918. Serial No. 240,068.

To all whom it may concern:

Be it known that I, BENJAMIN BROIDO, a citizen of the United States, and resident of New York, N. Y., have invented certain new and useful Improvements in Superheaters, of which the following is a specification.

My invention relates, as just stated, to superheaters, and more particularly to that type of superheaters which is installed in the same housing with a boiler, and is of greatest utility where the superheater is located in close proximity to the furnace. In cases where the superheater is so located, there is, under certain conditions, danger that the superheater may be injured during periods when the boiler is being fired up, and there is no steam circulating through the superheater structure. One of the objects of my invention is to make provision for adequate protection of the superheater parts during such periods. Other objects will appear as the description proceeds.

My invention will be readily understood from the following description which is to be read in connection with the accompanying drawing forming part hereof. In this drawing, Fig. 1 represents a central longitudinal section of a well-known type of boiler, and Fig. 2, a front view of same, embodying my invention. Fig. 3 is a view similar to Fig. 1, parts being broken away, illustrating a modification; while Fig. 4 is a view similar to Fig. 2, parts being omitted, illustrating another modification.

Referring first to Figs. 1 and 2, I have here illustrated my invention in connection with a well-known commercial type of boilers. The three drums 1, 2 and 3 are located in the upper part of the housing 4, and are connected with the lower drum 5, by means of the three sets of tubes 6, 7, and 8. From the furnace 9 the products of combustion pass successively over these banks of tubes, their course being directed by baffling, and finally escape to the stack through the connection 10. Above the furnace, and protected against the intense direct radiation from it by means of the baffle 11, is the superheater 12. This superheater comprises the two headers 13 and 14 located within the wall of the housing 4, and connected by means of the looped units 15. Steam is supplied to one of the headers from drum 1 by means of the connection 16, and after cir-

culating through the units 15 is conveyed back to the other header, whence it is carried to the point of consumption. As far as the present purpose is concerned, it makes no difference to which of the headers 13 or 14 the steam is supplied, and from which of the two it is finally taken off. It may, for example, be supplied to header 13 and taken off from header 14. Between the header 13 and the steam supply 16, there is located the valve 17, and between header 14 and the steam main to which the steam is conveyed, there is the valve 18.

The parts just briefly described are of usual or any preferred construction, and do not form part of my invention, except as combined with certain other features.

In the operation of the device as far as described, part of the gases from the furnace 9 pass directly over the water tubes 8, 7, and 6 of the boiler, while another portion first sweeps over the units 15 of the superheater, and then rejoins the main current of gases and passes with it over the boiler tubes.

It is evident that while the boiler is being fired up and there is no steam to circulate through the superheater, the units of the superheated might be injured by the intense heat to which they are exposed. To prevent this, I supply the following structure: I provide header 13 with an air inlet 19, opening to the atmosphere at any convenient point, and have in it the valve 20. From the header 14 a pipe 21 leads to the furnace 9, opening into it by means of two nozzles 22. This pipe 21 has in it a valve 23.

This part of the apparatus functions as follows: When the boiler is being fired up and steam is not yet being generated, the valves 17 and 18 are closed, while valves 20 and 23 are open. The difference in air pressure which creates a draft in the furnace 9 also operates to create a pressure difference between the point where pipe 19 opens to the atmosphere, and the point where nozzles 22 open to the furnace. This pressure difference is sufficient to induce an air circulation through the superheater, which cools the superheater, and at the same time furnishes preheated air to the furnace.

When steam begins to form and is carried to the engine or other point of consumption, a further protection to the superheater becomes unnecessary and the air circulation

through it is discontinued by closing valves 20 and 23. After this, valves 17 and 18 are opened and the operation is as usual.

In the modification shown in Fig. 3, the heated air, instead of being carried to the furnace 9, is led to the stack 24 by means of valved pipe 21^a. For reasons of convenience, this pipe 21^a is connected to the header 13 instead of header 14, and the air intake communicates with header 14.

As far as the operation of this modification is concerned, it is evidently very similar to that of Figs. 1 and 2, and calls for no detailed statement. The advantage from supplying preheated air to the furnace is, of course, lost in this modification.

In the modification of Fig. 4, instead of relying on the induced draft which supplies air to the furnace, the air circulation through the superheater is brought about by means of the blower 25. This forces air by means of valve pipe 19^a to the header 13; and after this air has circulated through the superheater units, it leaves header 14 by means of pipe 21 and is carried to the furnace as in Figs. 1 and 2.

Where the draft for the furnace is created by means of a blower system, it will be evident that no separate blower 25 needs to be installed, but that pressure air can be taken

from the blower system and carried to header 13. The operation of this form of device is evident from what has been stated above.

While I have illustrated and described my invention in the above as attached to a water tube boiler of a particular description, it will be evident that it may be used equally as well in connection with boilers of other types and designs; and while I have described the superheater as located at a particular point, it will be clear that my invention will have application to superheaters located elsewhere; and in general, it will be understood that the above description is merely illustrative, and that numerous modifications may be made without departing from the spirit of my invention.

What I claim is:

In apparatus of the class described, the combination of a boiler, a furnace, and a superheater all enclosed in a housing the furnace having an air inlet and an outlet for the products of combustion; means creating a higher air pressure at the inlet than at the outlet and thereby producing an air draft to the furnace; and means to utilize said pressure difference to create a circulation of air through the superheater.

BENJAMIN BROIDO.