

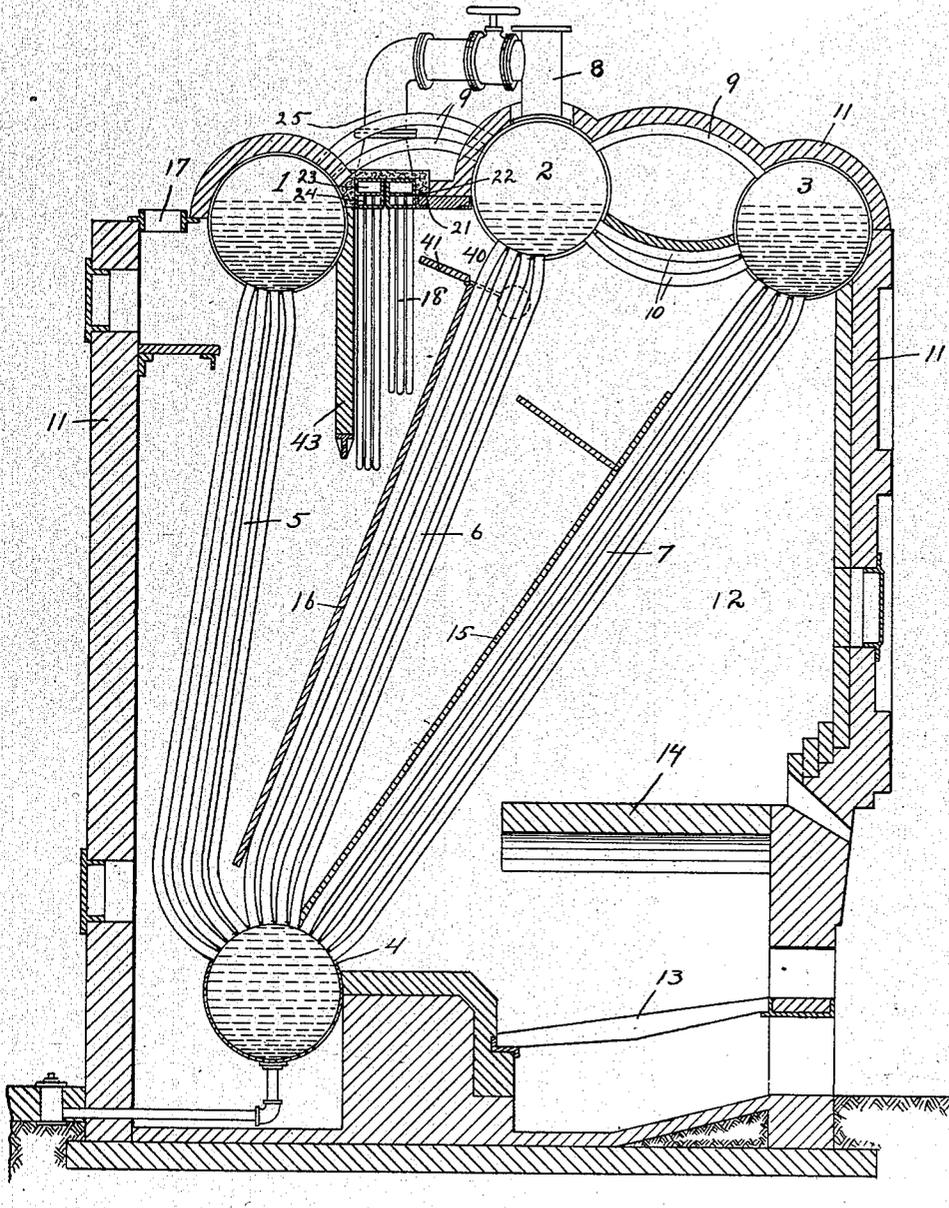
J. P. SNEDDON.
SUPERHEATER.

(Application filed Mar. 11, 1902.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1



Witnesses.

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2 Sheets—Sheet 2.

Fig. 2

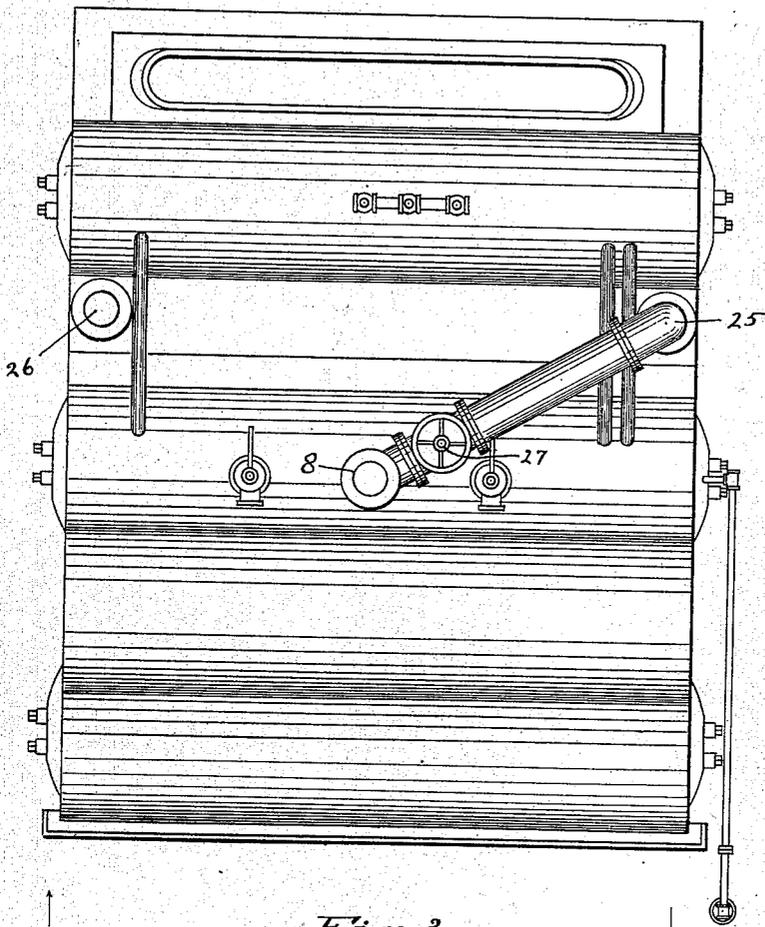
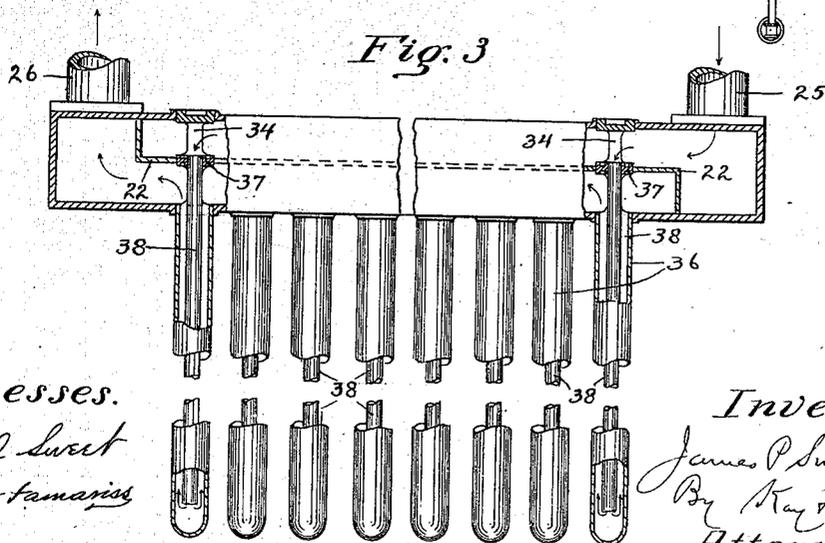


Fig. 3



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UNITED STATES PATENT OFFICE.

JAMES P. SNEDDON, OF BARBERTON, OHIO, ASSIGNOR TO THE STIRLING COMPANY, OF JERSEY CITY, NEW JERSEY, A CORPORATION OF NEW JERSEY.

SUPERHEATER.

SPECIFICATION forming part of Letters Patent No. 716,298, dated December 16, 1902.

Application filed March 11, 1902. Serial No. 97,731. (No model.)

To all whom it may concern:

Be it known that I, JAMES P. SNEDDON, a resident of Barberton, in the county of Summit and State of Ohio, have invented a new and useful Improvement in Superheaters; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to superheaters for steam-boilers, and more especially to superheaters located or projecting into a boiler-furnace; and its object is to provide such a superheater whereby a variable degree of superheating can be obtained and whereby the superheater can be cut out without liability of injuring the same.

To these ends my invention consists in locating the superheater with reference to the boiler-setting so that the superheating-tubes project into the boiler-furnace behind a baffle-wall and providing a controllable by-pass through the baffle-wall, whereby the hot gases and flames can either be directed through said superheater-tubes or cut off therefrom to any desired extent.

In the accompanying drawings I have shown my invention applied to a boiler of the well-known Stirling type, and in said drawings—

Figure 1 is a transverse section through the boiler, showing my superheater applied thereto. Fig. 2 is a plan view of the same; and Fig. 3 is a view, partly in section, showing the construction of header and superheater-tubes.

The boiler illustrated is of the well-known Stirling type, the particular boiler shown being a Stirling four-drum boiler comprising the upper steam and water drums 1, 2, and 3, the lower mud-drum 4, and the three banks of water-tubes 5, 6, and 7, connecting the mud-drum with the steam and water drums 1, 2, and 3, respectively. The feed-water inlet is connected to the drum 1, and the steam-outlet 8 is shown connected to the middle drum 2, although it may be connected to either of the other steam and water drums. The steam and water drums are connected by the steam-collecting pipes 9 and the drums 2 and 3 by the circulating-pipes 10. The several drums, tubes, and pipes are inclosed by the usual masonry walls 11, forming a heat-

ing-chamber 12. At the front and near the bottom of this chamber is the grate 13, and above the same is the ignition-arch 14. Just back of the bank of tubes 7 is the baffle wall or plate 15, and back of the bank of tubes 6 is the baffle plate or wall 16. The outlet to the chimney is at 17.

The construction so far described is the well-known four-drum Stirling boiler, and as it forms no part of my invention a detailed description thereof is unnecessary. Suffice it to say, that the feed-water entering the drum 1 passes down through the bank of tubes 5 into the mud-drum 4, and from this, inasmuch as the greatest heat is at the front of the furnace-chamber, it passes upward through the bank of tubes 7 to the drum 3, the steam passing over to the drum 2 by the pipes 9 and the water passing to the same drum through the pipes 10 and thence descending through the bank of tubes 6 to the mud-drum, in this way maintaining the well-known circulation of the Stirling boiler. In lieu of the four-drum Stirling boiler the invention can be equally as well applied to a three or a five drum Stirling boiler, or, in fact, to any water-tube boiler having a baffle wall or plate projecting into the same.

The superheater is shown at 18, and in the specific boiler illustrated this superheater is shown as located between the baffle-wall and the bank of tubes 5, in which position the superheating-tubes are shielded from the hot gases and flames when desired. It will be understood, however, that the superheater may be located at any other point in the particular boiler-furnace shown or any other boiler-furnace, provided only that it is located behind a baffle wall or plate, so that it can be protected from the hot gases and flames when necessary or desired. The position of the superheater will of course be varied according to the type or design of the boiler to which it is adapted. The superheater comprises the header or chamber 21, which is provided with a longitudinal diaphragm 22, dividing said header into two compartments or passages 23 and 24, respectively. One of these compartments—as, for instance, the compartment 23—is connected by a suitable

pipe 25 to the steam-outlet pipe 8, while the other compartment—as, for instance, the compartment 24—is connected by a suitable pipe 26 to the engine. In the particular superheater illustrated the steam-inlet to the header is shown at one end thereof and the steam-outlet at the other end thereof. This arrangement, however, is not essential, as the inlet and outlet may both be at the same end of the header or be the reverse of that shown. The steam-inlet for economical purposes will be preferably connected to the end of the header nearest the steam-outlet pipe of the boiler, while the outlet from the header will be from that portion of the header which can be most conveniently connected to the engine. The inlet-pipe 25 is provided with a cut-off valve 27, and the outlet-pipe may be provided with a similar valve. By these valves the superheater can at any time be cut and a by-pass pipe having a suitable valve will be provided around the superheater, so that in case the latter becomes disabled the saturated steam can be taken directly from the boiler to the engine.

The specific construction of this superheater is substantially that of the well-known Nielauss boiler and is shown in detail in Fig. 3. The top and bottom walls of the header and the diaphragm or partition there-through are provided with alining openings, in which are connected the skeleton frames or "lanterns," as they are called, 34. To the lower ends of these skeleton frames are attached the upper ends of the outer tubes 36, said tubes having closed bottom ends. Within the skeleton frames 34 are other skeleton frames 37, which extend from the top wall of the header to the diaphragm 22 and which have connected to their lower ends the inner circulating-tubes 38. These tubes extend down into the tubes 36 and have their bottom ends open and in proximity to the closed ends of the outer tubes. The skeleton frames 34 and 37 are cut away, so that free communication is had between the compartment 23 and the inner tubes 38 and the compartment 24 and the outer tubes 36. In use the steam entering the header passes from the compartment 23 through the skeleton frames 34 and 37 into the circulating-tubes 38 and through the latter to the lower ends of the tubes, and thence passes upward through the annular space between the inner and outer tubes and through the opening in the skeleton frames 34 to the compartment 24, and thence to the place of use.

This superheater is shown with its header in a horizontal position and embedded in the top wall of the furnace-chamber with the superheating-tubes projecting down into the furnace-chamber in the space behind the baffle-wall 16, and, as shown, two such headers with tubes of different lengths are placed side by side; but neither of these particulars is essential. The baffle-wall 16 is provided at its upper end with an opening 40 opposite the

upper ends of the tubes 36 and which can be closed by any suitable valve—such, for instance, as the hinged valve 41 or a pivoted butterfly or other valve. This opening 40, with the valve therein, forms a controllable by-pass, whereby the heated gases coming up from the furnace can be either directed through the superheater-tubes or else cut off therefrom to any desired extent. In this way a variable degree of superheating can be secured up to the maximum capacity of the superheater. To the rear of the superheater-tubes is a depending baffle-wall 43, which directs the heated gases so that they must pass down in between said superheater-tubes for their entire length. By locating the superheater-tubes behind the baffle-wall in the furnace-chamber and having the controllable by-pass shown any degree of superheating can be secured up to the maximum capacity of the superheater, and should it be desired to throw the superheater out of operation, as when it is desired to use saturated steam, or in case the superheater should be disabled this by-pass can be entirely cut off, so that the heated gases will no longer have direct contact with the superheater-tubes, and the temperature of that part of the furnace-chamber will not be so great as to injure these tubes. The opening 40 is so located that the heated gases strike the tubes near their connection with the header and when the steam therein is at its highest temperature, thus giving a maximum superheating.

My superheater, as hereinbefore stated, can be applied to any water-tube boiler having a baffle-wall projecting into the same, and the heater will be located behind said baffle-wall, and the latter will be provided with the controllable by-pass described. The terms "in front" and "behind," as used in the specification and claims, are intended to express relative locations only, the word "front" meaning toward the source of heat and the word "behind" meaning away from the source of heat.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a superheater for steam-boilers, the combination with a heating-chamber, of superheater-tubes in said chamber, steam inlet and outlet connections to said tubes, a baffle-wall in front of said tubes, and a controllable by-pass through said baffle-wall opposite the outlet end of said superheater-tubes.

2. In a superheater for steam-boilers, the combination with a heating-chamber, of a header having two compartments, tubes connected to said header and projecting into the heating-chamber, said tubes comprising outer tubes communicating with one of the header-compartments and inner tubes communicating with the other header-compartment, steam-inlet connections to one of said compartments and steam-outlet connections from the other of said compartments, a baffle-wall in front of said tubes and a controllable by-

pass through said baffle-wall opposite the point where said superheater-tubes connect with said header.

3. In a superheater for steam-boilers, the combination with a boiler-furnace, water-tubes therein, superheater-tubes projecting into said chamber, steam inlet and outlet connections to said tubes, a baffle-wall in front of said tubes, and a controllable by-pass through said baffle-wall opposite the outlet end of said superheater-tubes.

4. In a superheater for steam-boilers, the combination with a boiler-furnace, water-tubes therein, a header having two compartments, tubes connected to said header and projecting into the boiler-furnace between the water-tubes, said superheater-tubes comprising outer tubes communicating with one of the header-compartments and inner tubes communicating with the other of the header-compartments, steam-inlet connections to one of said compartments, steam-outlet connections from the other of said compartments, a baffle-wall in front of said tubes, and a controllable by-pass through said baffle-wall opposite the point where said superheater-tubes connect with said header.

5. In a superheater for steam-boilers, the combination with a heating-chamber, a plurality of elevated steam and water drums and a mud-drum therein, banks of water-tubes connecting the elevated steam and water drums and the mud-drum, a baffle-wall projecting between said banks of water-tubes, superheater-tubes projecting into the chamber behind said baffle-wall, and a controllable by-pass through said baffle-wall opposite the outlet end of said superheater-tubes.

6. In a superheater for steam-boilers, the combination with a heating-chamber, a plurality of elevated steam and water drums and a lower mud-drum therein, banks of water-tubes connecting the elevated steam and wa-

ter drums with the mud-drum, a baffle-wall between said banks of water-tubes, a header having two compartments, superheater-tubes connected to said header and projecting into the chamber behind said baffle-wall, said tubes comprising outer tubes communicating with one of the header-compartments and inner tubes communicating with the other header-compartment, steam-inlet connections to one of said compartments, steam-outlet connections from the other of said compartments, and a controllable by-pass through said baffle-wall.

7. In a superheater for steam-boilers, the combination with a boiler-furnace, water-tubes therein, a baffle-wall projecting into said chamber between said water-tubes, superheater-tubes projecting into said chamber behind said baffle-wall, steam inlet and outlet connections to said superheating-tubes, a controllable by-pass through said baffle-wall opposite the outlet end of said superheater-tubes, and a baffle-wall behind said superheater-tubes.

8. In a superheater for steam-boilers, the combination with a heating-chamber, a plurality of elevated steam and water drums and a lower mud-drum therein, banks of water-tubes connecting the steam and water drums with the mud-drum, a baffle-wall projecting down into said chamber between said banks of water-tubes, superheater-tubes projecting into the chamber behind said baffle-wall, a controllable by-pass through said baffle-wall, and a baffle-wall projecting down into the chamber behind said superheater-tubes.

In testimony whereof I, the said JAMES P. SNEDDON, have hereunto set my hand.

JAS. P. SNEDDON.

Witnesses:

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