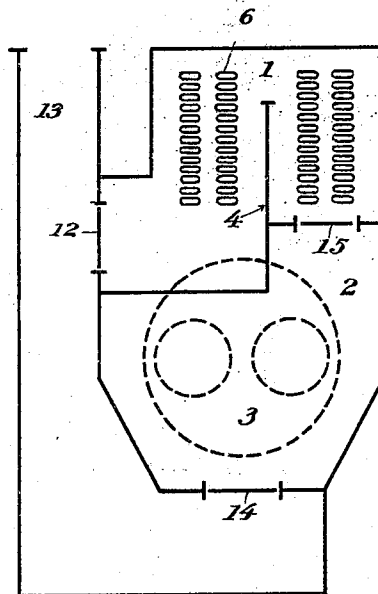
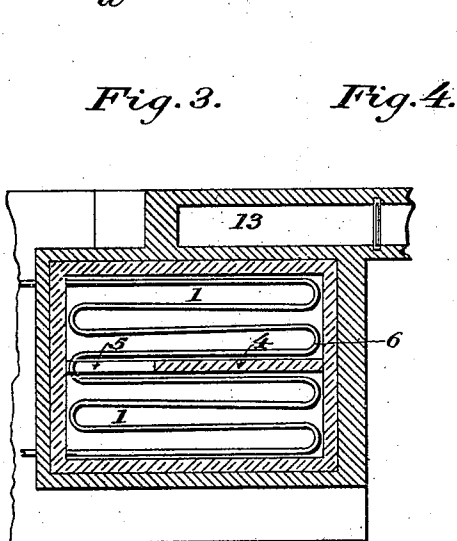
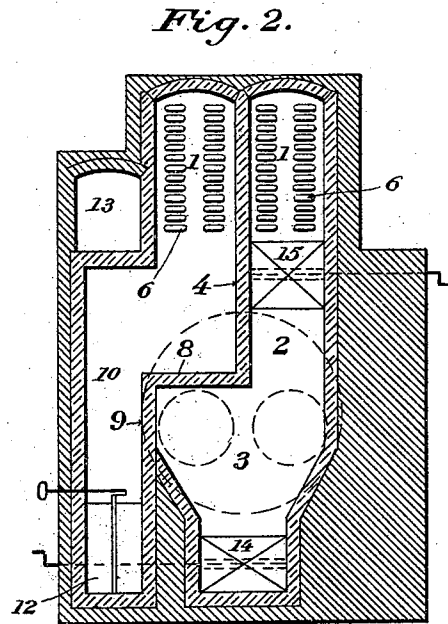
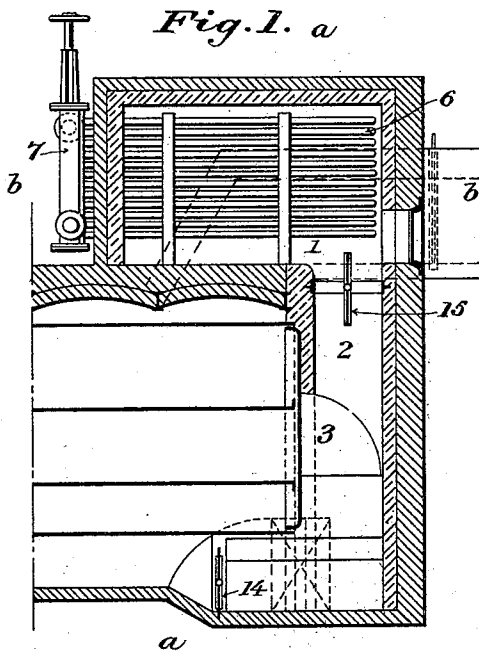


A. HERING.
STEAM SUPERHEATER.
(Application filed Jan. 30, 1901.)

(No Model.)

2 Sheets—Sheet 1.



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2 Sheets—Sheet 2.

Fig. 5.

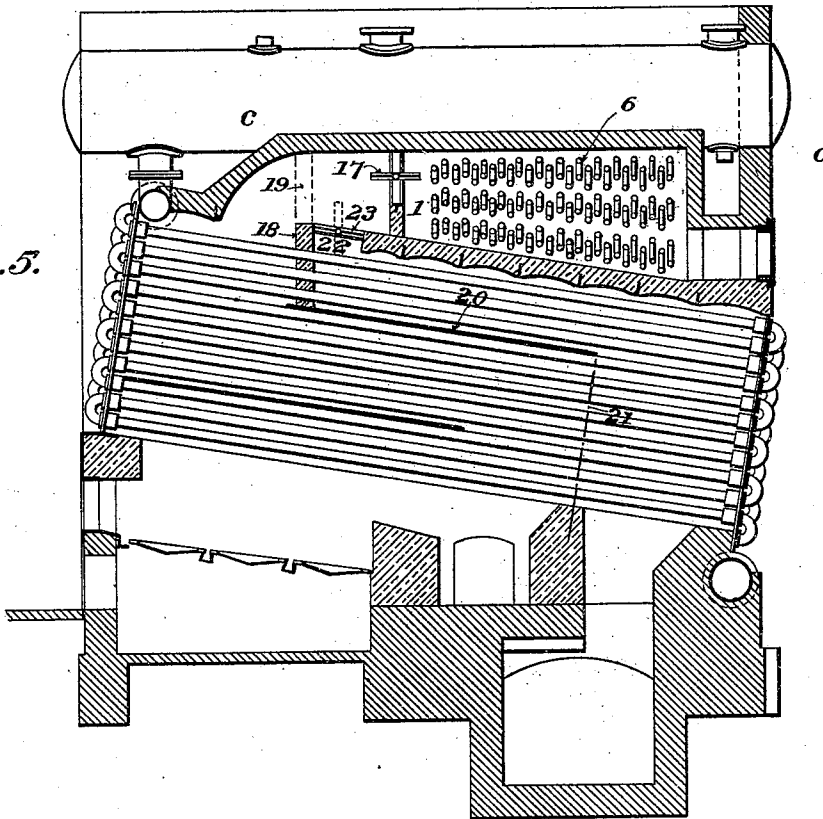
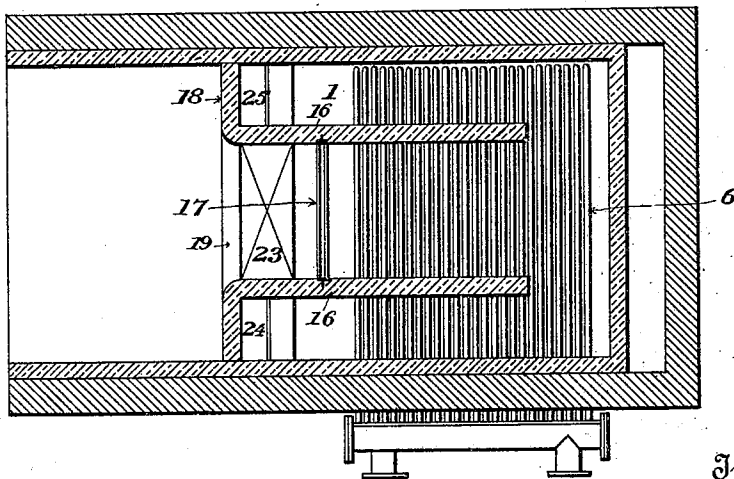


Fig. 6.



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UNITED STATES PATENT OFFICE.

AUGUST HERING, OF NUREMBERG, GERMANY.

STEAM-SUPERHEATER.

SPECIFICATION forming part of Letters Patent No. 683,758, dated October 1, 1901.

Application filed January 30, 1901. Serial No. 45,310. (No model.)

To all whom it may concern:

Be it known that I, AUGUST HERING, of Nuremberg, Empire of Germany, have invented a new and useful Improvement in Steam-Superheaters, (patented in Great Britain, No. 17,900, August 19, 1898,) of which the following is a specification.

This invention has reference to steam-superheaters, and relates more particularly to the heating-chamber in which the superheater-pipes are inclosed and the means for controlling and regulating the flow of the products of combustion and gases through the chamber.

The invention consists of so forming the superheating-chamber that the products of combustion will enter one end, flow to the opposite end around the superheater-pipes, and again return to the entrance end.

The invention consists also in providing valves in the flues through which the products of combustion flow for the purpose of controlling the path and flow of the same, to the end that the degree of superheating may be regulated and the superheater-chamber thrown out of action.

The invention consists also in the details of construction and combination of parts hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a vertical section of the superheater-chamber and the rear end of a boiler, showing the communication of the chamber with the boiler-flues. Fig. 2 is a transverse section through the same on the line *a a*. Fig. 3 is a horizontal section of the same on the line *b b* of Fig. 1. Fig. 4 is a view in the nature of a diagram, showing the connection of the superheater-chamber with the flues and the valves controlling the communication. Fig. 5 is a vertical longitudinal section of a modification, showing how the products of combustion after leaving the superheater-chamber may be made to act on the boiler-tubes. Fig. 6 is a horizontal section through the same on the line *c c*.

Referring to Figs. 1 to 4, the superheating-chamber 1 is rectangular in form and is situated on the rear end of the masonry or casing inclosing the boiler, with its rear end in communication with a vertical passage or flue 2, which is in turn in communication with the boiler-flues 3. Within this flue a verti-

cal partition 4 rises and extends into the superheating-chamber, to the top of the same, but terminates some distance in rear of the front end of the chamber, as shown in Fig. 3, thus forming two compartments in the chamber which communicate at their forward ends, as at 5. On each side of this partition and extending the whole length of this chamber superheater-pipes 6 are arranged, which extend through the front of the chamber, where they are connected to vertical collectors 7. The vertical partition 4 extends laterally at its lower end, as at 8, and then downwardly, as at 9, so that the products of combustion from the boiler-flues will pass directly upward on one side of the partition, will enter the superheater-chamber at its rear, and, flowing forward around the pipes, will return on the other side of the partition and flow downward in the space 10 to its base, where they will find an exit through opening closed by a valve 12 into a flue 13, leading to the smoke-stack. The flue 13 also communicates with the base of the vertical flue 2, which communication is controlled by a valve 14, so that the products of combustion may be diverted through this opening without passing to the superheater-chamber. The communication of the flue 2 with the superheater-chamber is controlled by a valve 15, situated in the flue where it joins the rear end of the chamber. In the operation of the apparatus when it is desired that the superheater-pipes be subjected to the influence of the heat of the products of combustion and gases the valve 14 is closed and valves 15 and 12 opened, so that the gases will flow upward into the superheater-chamber and, flowing around the pipes, will leave the chamber and enter the space 10, from which the gases will flow through the opening 11 in the base of the same to the flue 13, connecting with the smoke-stack. When it is desired to throw the superheater out of action when repairs are needed or for other reasons, the valve 14 is opened and valves 15 and 12 closed, the result being that the gases will flow downward from the flues and out through valve 14 into flue 13 and then to the smoke-stack. By means of these valves it is possible to regulate the amount of gases passing through the chamber, so as to control the amount of superheating. This

is accomplished by partially opening valves 12 and 15 and partially closing valve 14, the result being that a portion only of the gases will pass through the chamber and act on the 5 pipes, the remainder passing directly to the smoke-stack through valve 14.

In Figs. 5 and 6 I have represented another manner of causing the gases to enter at one end of the chamber, flow to the opposite end, 10 and return to the entrance end, and another arrangement of valves for controlling the path of the gases. In this case the superheater-chamber inclosing the pipes is situated on the top of the masonry inclosing a tubular boiler, and the chamber is divided by two 15 vertical parallel walls 16 into three passages communicating at their rear ends. The products of combustion in their passage through the chamber enter the central passage and, dividing at the rear of the chamber, return to the front through the two side passages. The entrance to the central passage is controlled by a valve 17, situated between the two partitions, and in front of this valve the bottom 25 of the chamber is extended and joins a vertical transverse wall 18, formed by a continuation of the two partitions and extending downward some distance throughout the width of the boiler-tube space. The wall 18 is formed at its center, where the two partitions join it, with an opening 19, through which the products of combustion may pass, and the lower edge of the wall terminates at the front edge of the baffle-plate 20, extending rearwardly between the boiler-tubes and downward, as at 21, thus dividing the space occupied by the tubes into front and rear sections. The space forward of this baffle-plate communicates through an opening 22 in the extended bottom of the superheater-chamber 40 with the space in rear of the baffle-plate, so that the products of combustion from the furnace will first circulate around the forward portion of the tubes and then passing upward through the opening 19 in the wall 18 will flow downward and rearward and act on the rear portion of the tubes. The opening 22 is controlled by a valve 23, by means of which the gases may be caused to 50 enter the superheater-chamber before they act on the rear portion of the boiler-tubes, valves 24 and 25 being provided in the side passages to control the communication between these passages and the tube-space of the boiler. When the apparatus is in operation, valve 23 is closed and valves 17, 24, and 25 opened, the result being that the gases will flow into the chamber in the central passage and, returning by the side passages, will descend through valves 24 and 25 and will act 60 on the rear portion of the boiler-tubes, escaping through the stack. If the superheater is to be thrown out of action, valves 17, 24, and 25 are closed and valve 23 opened, which will 65 result in the gases passing from the furnace

forward beneath the baffle-plate 19, thence upward through wall 18, thence downward through opening 22 into the space above and in rear of the baffle-plate 19, and thence outward through the stack. By a proper partial 70 opening of the various valves the degree of superheating may, like in the first instance, be regulated.

Having thus described my invention, what I claim is—

1. The combination with a superheater-chamber formed with passages communicating at one end with each other within the chamber, of a superheater situated in said passages, said chamber being provided at its 80 end with entrance and exit openings for the products of combustion and the said openings communicating respectively with said passages; whereby the products of combustion will enter the chamber at one end, flow to the 85 other end and return to and leave the entrance end.

2. The combination with a superheating-chamber formed with passages communicating with each other at one end within the 90 chamber, of superheating-pipes situated in said passages, said chamber being provided at its end with entrance and exit openings for the products of combustion communicating respectively with said passages, and 95 valves situated in said openings for controlling the passage of the products of combustion.

3. The combination with a superheating-chamber, of flues leading from the furnace 100 and communicating with said chamber and communicating also with the smoke-stack, a valve controlling the communication of the flues with the chamber, and a valve controlling the communication of the flue with the 105 smoke-stack.

4. The combination with a furnace, of a boiler having the space occupied by the tubes divided into a front and rear section, a valved communication between said sections, a su- 110 perheating-chamber having a valved communication with the front section and also with the rear section, and a superheater in said chamber.

5. The combination with a superheating-chamber formed with passages, of a flue leading from the furnace and communicating with one of said passages and also with the stack, valves controlling said communications, a communication between the other passage 120 and the stack, and a valve controlling said communication.

In testimony whereof I hereunto set my hand, this 27th day of December, 1900, in the presence of two attesting witnesses.

AUGUST HERING.

Witnesses:

A. IRTH,
R. HERING.