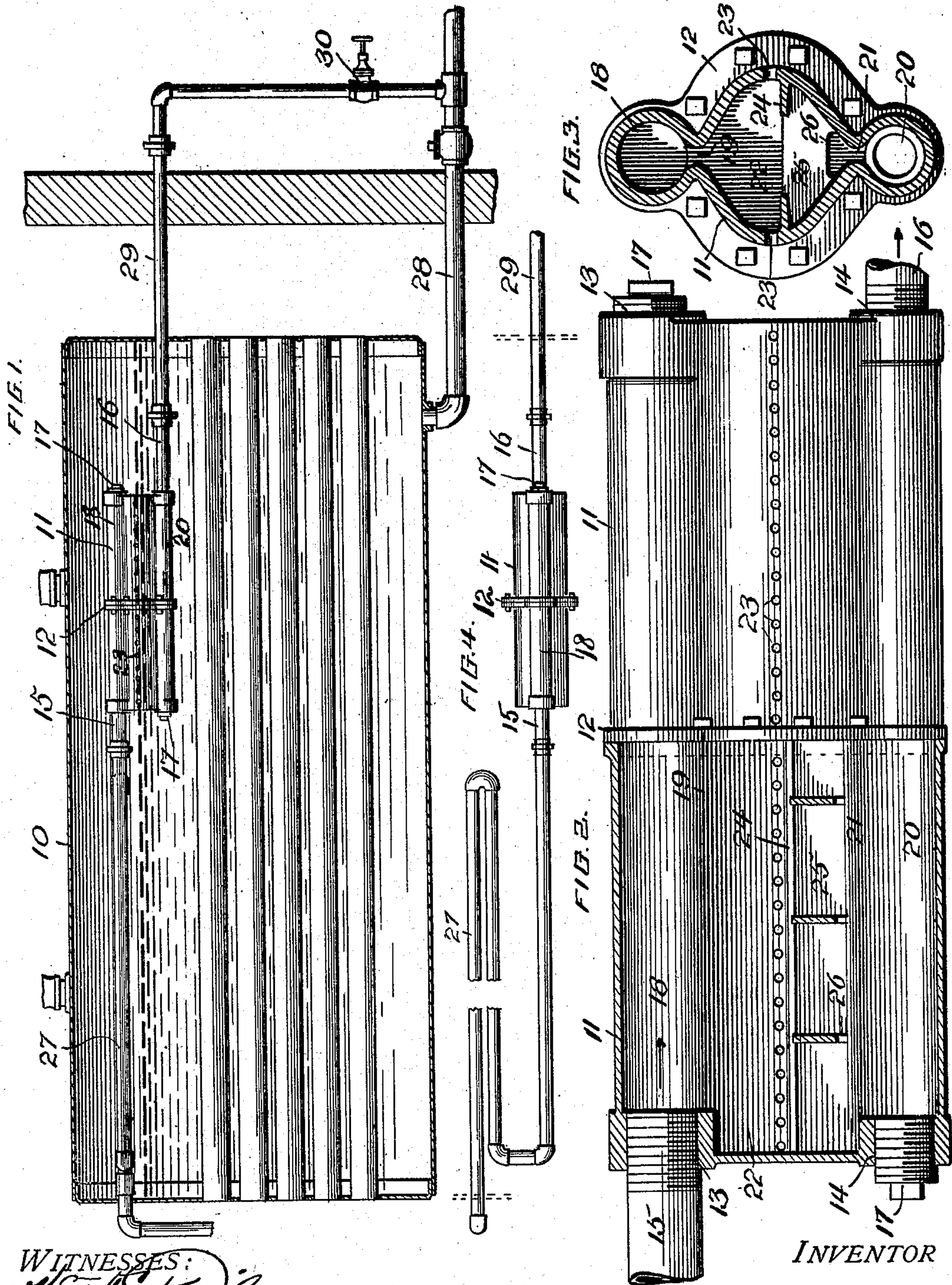


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 FEED WATER PURIFIER.  
 APPLICATION FILED JAN. 4, 1909.

932,660.

Patented Aug. 31, 1909.



WITNESSES:  
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# UNITED STATES PATENT OFFICE.

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## FEED-WATER PURIFIER.

932,660.

Specification of Letters Patent.

Patented Aug. 31, 1909.

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*To all whom it may concern:*

Be it known that I, JOHN WOOD, Jr., citizen of the United States, residing at Conshohocken, county of Montgomery, and State of Pennsylvania, have invented certain new and useful Improvements in Feed-Water Purifiers, of which the following is a specification, reference being had therein to the accompanying drawing.

10 This invention relates to a feed water purifier, and particularly to a structure whereby the liquid is superheated or vaporized and the sediment collected therefrom before its introduction into the steam boiler  
15 so as to remove the scale forming material from the water.

The invention has for an object to provide a casing formed with a feed chamber at its upper portion and a sediment chamber at the lower portion thereof and a steam chamber with discharge openings intermediate of said portions in connection with superheating pipes whereby the liquid may be superheated or vaporized in its passage  
25 to the casing.

A further object of the invention is to provide the portion of the casing intermediate of the feed and sediment chambers with baffle plates extending longitudinally beneath the discharge openings in order to prevent sediment being carried through said openings in the feeding flow to the boiler, and also transversely disposed partitions above the sediment chamber in order that the cleaning of this chamber by the blowing off action may not be confined to any particular part thereof, and the lower portion of the casing divided into a series of independently acting sections.

40 Other and further objects and advantages of the invention will be hereinafter fully set forth and the novel features thereof defined by the appended claims.

In the drawing:—Figure 1 is a vertical section through a steam boiler showing the application of the invention thereto. Fig. 2 is an elevation of the purifying casing with portion thereof in vertical section; Fig. 3 is a transverse vertical section through Fig. 2; Fig. 4 is a plan of the casing and its connections.

Like numerals refer to like parts in the several views of the drawing.

55 The numeral 10 designates a steam boiler which may be of any desired construction or configuration as the invention is applicable

to any and all forms of heating apparatus to which water is fed. The purifier casing 11 is disposed within the boiler in any desired position with the upper portion thereof 60 above the water level and in the steam space of the boiler. This casing may be formed in any desired shape or manner and is here shown as comprising separate sections centrally joined by means of the bolting flange 65 12, while the opposite ends of these sections are each formed with threaded openings 13 and 14 for the application of the pipe connections and so as to permit their reversal in position whenever desired. The opening 13 70 at one end is adapted to receive a feed pipe 15 at the upper portion, while the opening 14 at the opposite end is adapted to receive the blow off pipe 16 at the lower portion. The remaining openings 13 and 14 are closed 75 by means of plugs 17 in the usual manner.

In the form of casing here shown the upper portion is formed as a circular feed chamber 18 having at its lower portion a longitudinally extending slot or opening 19 80 of less diameter or area than the chamber. The lower portion of the casing is formed with a similarly shaped sediment chamber 20 also having a longitudinally extending opening 21 of less diameter than the cham- 85 ber. Intermediate of these chambers the casing is enlarged as shown at 22 and the walls thereof provided with discharge openings 23. Beneath these openings and extending longitudinally of the casing are baffle 90 plates 24 disposed at substantially right angles to the natural flow through these openings and arranged to prevent the sediment or solid matter being carried with the feed water through the discharge openings. Ex- 95 tending transversely of the casing are a series of partitions 25 each formed adjacent the opening 21 with a cutaway portion 26. These partitions divide the casing into a series of sections acting independently so 100 that in the cleaning or blowing off action no material can collect in any portion of the sediment chamber as the pressure is applied equally to all parts of the casing.

In order to secure the most efficient pre- 105 cipitation of the sediment or solid matters it is desirable to superheat the water before its entrance into the feed chamber and this may be effected by any preferred arrangement of vaporizing or superheating pipes, 110 for instance, a return coil 27 which may be formed with any required length of pipes



and disposed in any desired position relative to the casing, but preferably above the water level and in the steam space of the boiler. This superheating pipe is connected to the usual water feed. The opposite end of the casing is also connected with the usual blow off 28 by means of the pipe connection 29 provided with the controlling valve 30 which when opened permits the boiler pressure to act through the purifier casing and force the collected sediment from the lower chamber thereof.

In the operation of the invention the feed water is superheated or vaporized and the solid or scale forming materials are thus precipitated as the water is discharged from the feed chamber into the body of the casing. These solid matters pass downward into the sediment chamber and into the lower portion thereof, while the purified water is discharged through the openings at the opposite sides of the casing which are preferably disposed about the normal water level of the boiler. The discharge through the contracted opening at the lower portion of the chamber causes the water to pass through the steam space within the casing intermediate the two chambers, and the water having been previously brought to a high temperature in the superheating pipe is thus raised to a point of vaporization. This having taken place the solid matters are precipitated by gravity to the sediment chamber which is connected to the casing by the slot opening extending for the length thereof. Whenever it is desired to clean or discharge the sediment chamber the valve in the blow off pipe may be opened and the accumulated solid matters drawn off. The arrangement of the baffle plates beneath the discharge openings from the steam space prevents any sediment being carried to the boiler in the flow of the feed water, while the division of the casing into sections by the transverse partitions equalizes the blowing off action and applies the pressure to each and all parts of the sediment chamber. It will therefore be seen that this invention presents, a simple, efficient and economically constructed form of water purifier adapted for application to all forms of boilers already in use and in its feeding action effectually removes all sediment and solid matter from the feed water thus preventing the formation of scale upon the walls of the boiler or the tubes thereof.

Having described my invention and set forth its merits, what I claim and desire to secure by Letters Patent is:—

1. In a feed water purifier, an inclosing casing provided with a steam chamber having discharge openings, a feed chamber above the steam chamber discharging downwardly therein, and a sediment chamber disposed beneath the steam chamber.

2. In a feed water purifier, an inclosing casing provided with a steam chamber having discharge openings, a feed chamber above the steam chamber discharging downwardly therein, a sediment chamber disposed beneath the steam chamber, in combination with a superheating pipe connected with said feed chamber, and a blow off connection from said sediment chamber.

3. In a feed water purifier, an inclosing casing provided with a steam chamber having discharge openings in its said side walls, a feed chamber discharging downwardly into said steam chamber through a contracted opening, and a sediment chamber beneath said steam chamber and communicating therewith by a contracted opening.

4. In a feed water purifier, a casing having a feed chamber at its upper portion, a sediment chamber at its lower portion, an intermediate steam chamber provided with a discharge opening in the side walls thereof, and a longitudinally extending baffle plate disposed beneath said opening.

5. In a feed water purifier, a casing having a feed chamber at its upper portion having a blow off connection, a sediment chamber at its lower portion, an intermediate steam chamber provided with a discharge opening in the side walls thereof, and a series of transverse partitions disposed above the sediment chamber.

6. In a feed water purifier, a casing having a feed chamber at its upper portion having a blow off connection, a sediment chamber at its lower portion, an intermediate steam chamber provided with a discharge opening in the side walls thereof, a series of transverse partitions disposed above the sediment chamber, and baffle plates extending longitudinally of the casing beneath said openings.

7. In a feed water purifier, a casing having a feed chamber at its upper portion, a sediment chamber at its lower portion, an intermediate steam chamber provided with a discharge opening in the side walls thereof, a series of transverse partitions disposed above the sediment chamber, baffle plates extending longitudinally of the casing beneath said openings, a superheating coil connected with said feed chamber, and a blow off connection connected with said sediment chamber.

8. In a feed water purifier, a casing having at its upper portion a feed chamber and at its lower portion a sediment chamber, an intermediate steam chamber having discharge openings, the communicating openings from said feed and sediment chambers being of less diameter than that of the said chambers, and inwardly extending baffle plates disposed beneath the discharge openings of the steam chamber.

9. In a feed water purifier, a casing hav-



ing at its upper portion a feed chamber and  
at its lower portion a sediment chamber, an  
intermediate steam chamber having dis-  
charge openings, the communicating open-  
5 ings from said feed and sediment chambers  
being of less diameter than that of the said  
chambers, inwardly extending baffle plates  
disposed beneath the discharge openings of  
the steam chamber, downwardly extending  
10 spaced partitions having a cutaway portion  
adjacent the entrance to the sediment cham-  
ber and a blow off connection from said  
chamber.

10. In a feed water purifier, a casing com-  
15 prising opposite sections having a bolting  
flange at their central portion each of said  
sections being formed with feed and sedi-

ment chambers having contracted communi-  
cating openings with an intermediate steam  
chamber, the walls of which are formed with 20  
a series of discharge openings, longitudinally  
extending baffle plates beneath said dis-  
charge openings, a series of transverse par-  
titions disposed between said plates and the  
sediment chamber, a superheating pipe com- 25  
municating with the feed chamber, and a  
blow off pipe communicating with the sedi-  
ment chamber.

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

JOHN WOOD, JR.

Witnesses:

CHAS. RIEDER, Jr.,

GEO. VOIGT.