

T. GRIEVE.
 FEED WATER PURIFIER.
 APPLICATION FILED MAR. 22, 1909.

939,010.

Patented Nov. 2, 1909.

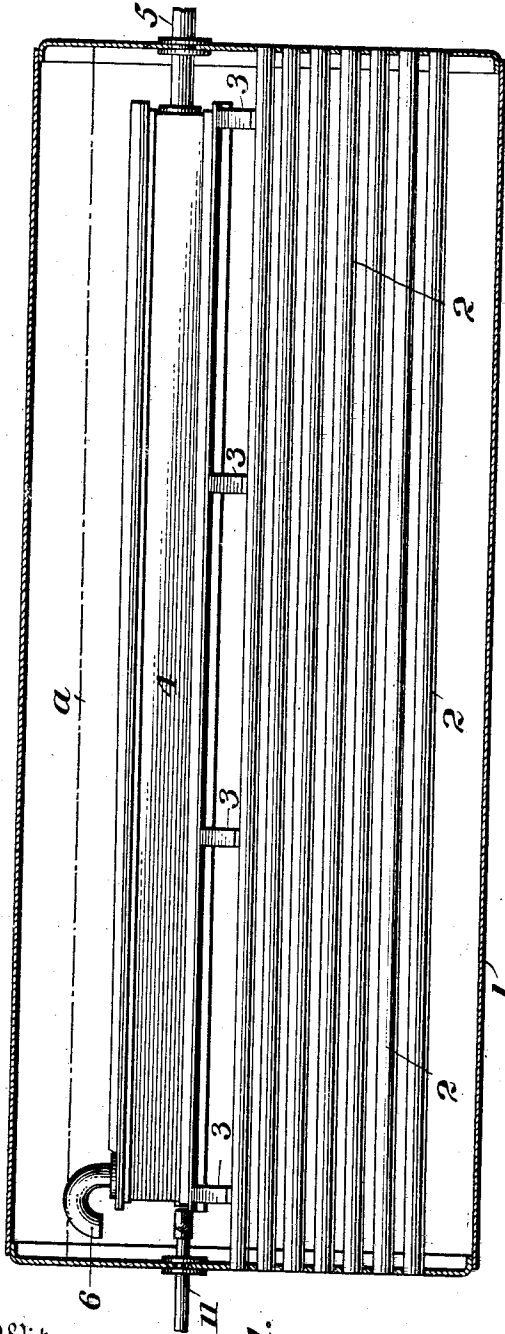


Fig. 1.

Witnesses

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Walter E. Paul

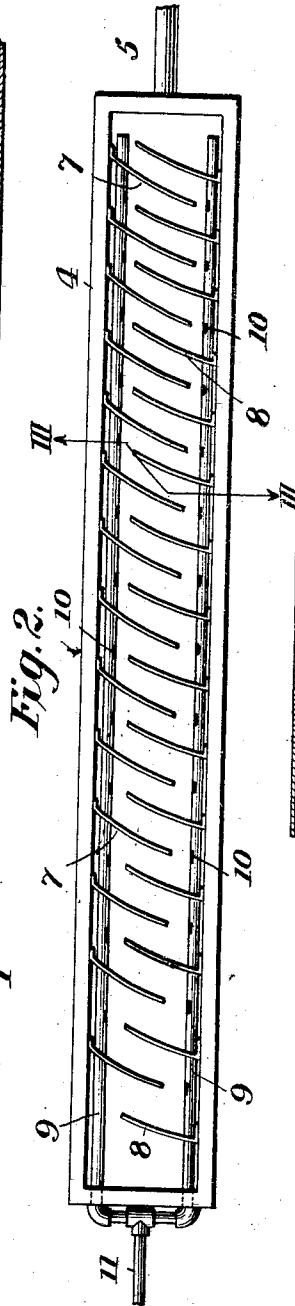


Fig. 2.

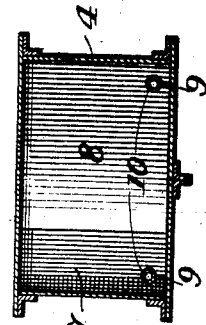


Fig. 3.

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UNITED STATES PATENT OFFICE.

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FEED-WATER PURIFIER.

939,010.

Specification of Letters Patent.

Patented Nov. 2, 1909.

Application filed March 22, 1909. Serial No. 484,974.

To all whom it may concern:

Be it known that I, THOMAS GRIEVE, a citizen of the United States, residing at Perth Amboy, in the county of Middlesex and State of New Jersey, have invented certain new and useful Improvements in Feed-Water Purifiers, of which the following is a specification.

My invention relates to water purifiers, boiler cleaners, and combined feed water heaters and purifiers.

The object of my invention is to carry the incoming feed water of a boiler through a zone of high temperature and to be supplied into the boiler proper free of all impurities and above boiling point or at a temperature corresponding to that of the steam in the boiler.

As is well known water parts with all its impurities or scale-forming substances at its first boiling, and by retaining feed water at this high temperature in a closed chamber, for as long a time as possible, the scale-forming impurities contained in the water will be precipitated in the purifier or cleaner and before said impurities are carried into the boiler and deposited on its heating surfaces where the incrustations in a great many instances due to the construction of the boiler it is inaccessible and removed with great difficulty. The depositing of these impurities or scale in a boiler greatly reduces the efficiency and life of the boiler due to corrosion and leakages.

To increase the period of time in which the feed water is retained in a given length of cleaner or purifier, I have provided a series of curved plates set vertically and transversely to the direction of flow of the water through the purifier, so that an eddying and circuitous route has to be taken by the water in passing through the apparatus. These plates are likewise slightly curved and alternately turned back to give an easy motion to the flowing water, and placed increasing distances apart from the water inlet to the outlet in order to reduce the velocity of the water to a minimum, so that the scale-forming impurities or precipitates can

quickly and effectually settle to the bottom and in position to be blown out of the apparatus.

My invention consists in the several novel features of construction and relative arrangement of the parts which will be hereinafter more fully described and particularly pointed out in the appended claims.

In the drawings, Figure 1 represents a sectional view of a boiler showing the relative arrangement and side elevation of my improved purifier. Fig. 2 is a top plan view of the purifier with its cover removed. Fig. 3 is an enlarged transverse sectional view on line III—III of Fig. 2.

Similar reference characters indicate the same parts in the several views.

1 represents the boiler and 2, 2 the tubes of the same, the upper row of which in this instance carrying a series of supports or brackets 3, 3. Resting on these brackets is the closed box or receptacle 4, of the water heater and purifier provided with a water inlet 5, which is at one end of the receptacle and connected with any suitable source of water under pressure.

6, is the feed water outlet at the opposite end of receptacle 4 from that of the inlet and preferably as indicated with a turned down end and connected with the upper section of the purifier. Said receptacle or purifier is preferably placed below the water level *a* of the boiler, and while I have shown and described the same in such relation, it will be readily understood that this forms no essential feature of my invention as the said purifier may also be placed in the steam space of any type of boiler, so long as the water passing through the purifier is thoroughly and highly heated thereby precipitating its impurities.

7, 8, are a series of upright and curved plates preferably fastened to the side walls of the box 4, and extending from top to bottom. Said plates are curved as shown and shorter than the width of the box 4, the plates 7, being fastened on one side wall while plates 8, are secured to the opposite sides. These plates are alternately arranged

of staggered so as to form a circuitous passage for the water in passing from the inlet 5, to outlet 6. The plates 8, are turned back toward the inlet 5, to give an eddying action to the water, and the distance between the plates increases from the inlet to the outlet so as to reduce the velocity of the water which becomes nearly quiescent, so as to permit all the precipitates to drop to the bottom of the receptacle and the heated feed water enter the boiler purified.

9, 9, are blow-off pipes at the bottom of the receptacle 4, and are provided with openings 10, 10, through which the precipitated impurities pass when a valve not shown is opened in pipe 11, connecting said pipes 10, 10, and while I have shown two pipes 10, only one may be used if so desired. The pipes 9, 9, are so arranged that as the water passes backward and forward in its sinuous path on the bottom, the precipitated impurities are carried toward the openings 10, 10, and placed in such a position as to be easily and completely blown out of the purifier.

It will be seen from the foregoing description and relation of parts and mode of operation, I have devised a heater in which all solid matter, sediment and other impurities in feed water are deposited within the area of the cleaner or purifier, and also provide a complete blowing out or removal of such matter or impurities while the boiler is in use, hot, and under working pressure, thereby permitting the boiler to be run continuously for any length of time and cleaned out at will.

While I have shown and described my device as applied to a fire tube boiler, I wish it to be distinctly understood in carrying out my invention, the same may necessarily be employed with any kind of type of boiler, it only being necessary that the purifier or cleaner be exposed to the heat of the boiler.

Having now fully described my invention what I claim as new and desire to secure by Letters Patent is:—

1. A feed water purifier or cleaner comprising a horizontal receptacle having an imperforate bottom and sides and a feed water inlet at one end and an outlet at its other end, a series of separated deflecting plates shorter than the width of the receptacle and secured within the same and inclined toward the outlet, and a second series of deflecting plates interposed between the first series of plates and inclined toward the inlet, said two series of plates forming a continuous and sinuous passage in said receptacle, a blow-off pipe having a series of openings and parallel and adjacent each side, whereby the feed water is compelled to flow alternately forward and backward across the bottom and toward the blow-pipe openings.

2. A feed water purifier or cleaner com-

prising a horizontal receptacle having an imperforate bottom and sides and a feed water inlet at one end and an outlet at its other end, a series of separated and curved deflecting plates shorter than the width of the receptacle and secured within the same and inclined toward the outlet, and a series of similar deflecting plates interposed between the first series of plates and inclined toward the inlet, said two series of plates forming a continuous and sinuous passage in said receptacle, a blow-off pipe having a series of openings and parallel and adjacent each side, whereby the feed water is compelled to flow alternately forward and backward across the bottom and toward the blow-off pipe openings.

3. A feed water purifier or cleaner comprising a horizontal receptacle having an imperforate bottom and sides and a feed water inlet at one end and an outlet at its other end, a series of separated and curved deflecting plates shorter than the width of the receptacle and secured within the same and inclined toward the outlet, and a series of similar deflecting plates interposed between the first series of plates and inclined toward the inlet, the distance between said two series of plates gradually increasing from the inlet toward the outlet end and forming a continuous and sinuous passage in said receptacle, whereby the feed water is compelled to flow alternately forward and backward across the bottom.

4. A feed water purifier or cleaner comprising a horizontal receptacle having an imperforate bottom and sides and a feed water inlet at one end and an outlet at its other end, a series of separated deflecting plates shorter than the width of the receptacle and secured to a side wall and within the receptacle and inclined toward the outlet, a second series of similar deflecting plates secured to the opposite side wall and interposed between the first series of plates and inclined toward the inlet, said distance between the two series of plates gradually increasing from the inlet toward the outlet end, said two series of plates forming a continuous and sinuous passage in said receptacle and compelling the feed water to flow alternately forward and backward across the bottom, and a blow-off pipe communicating with the bottom of the receptacle and adjacent to the side wall.

5. A feed water purifier or cleaner comprising a horizontal receptacle having an imperforate bottom and sides and a feed water inlet at one end and an outlet at its other end, a series of separated and curved deflecting plates shorter than the width of the receptacle and secured to side wall and within the receptacle and inclined toward the outlet, a series of similar deflecting plates se-

cured to the opposite side wall and inter-
posed between the first series of plates and
inclined toward the inlet, said two series of
plates forming a continuous and sinuous
5 passage in said receptacle, and compelling
the feed water to flow alternately forward
and backward across the bottom, and a blow-
off pipe having a series of openings con-

nected with the receptacle and adjacent to
the side wall.

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

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THOMAS GRIEVE.

Witnesses:

R. E. COMEGYS,
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