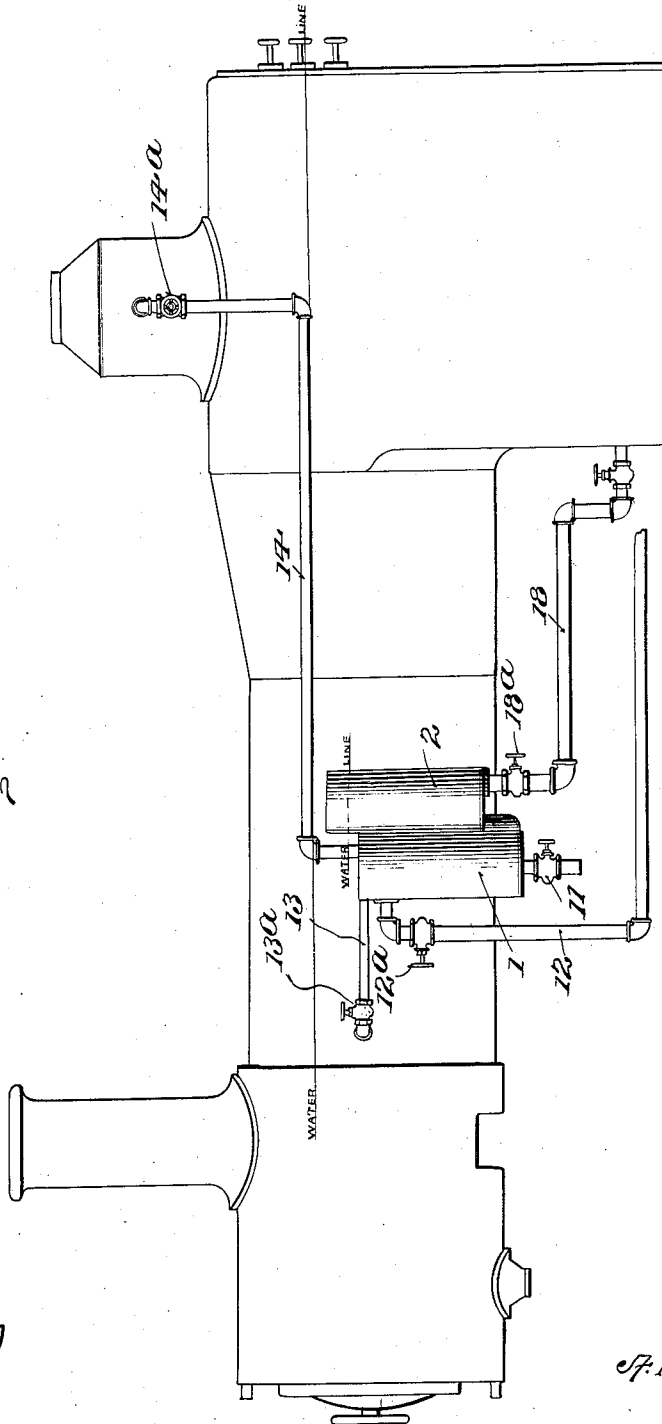


A. N. JONES.
 BOILER CLEANER AND FEED WATER HEATER.
 APPLICATION FILED DEC. 28, 1908.

934,314.

Patented Sept. 14, 1909.
 2 SHEETS—SHEET 1.

Fig. 1.



Witnesses

J. M. Munn
A. N. Woodson

Inventor

A. N. Jones

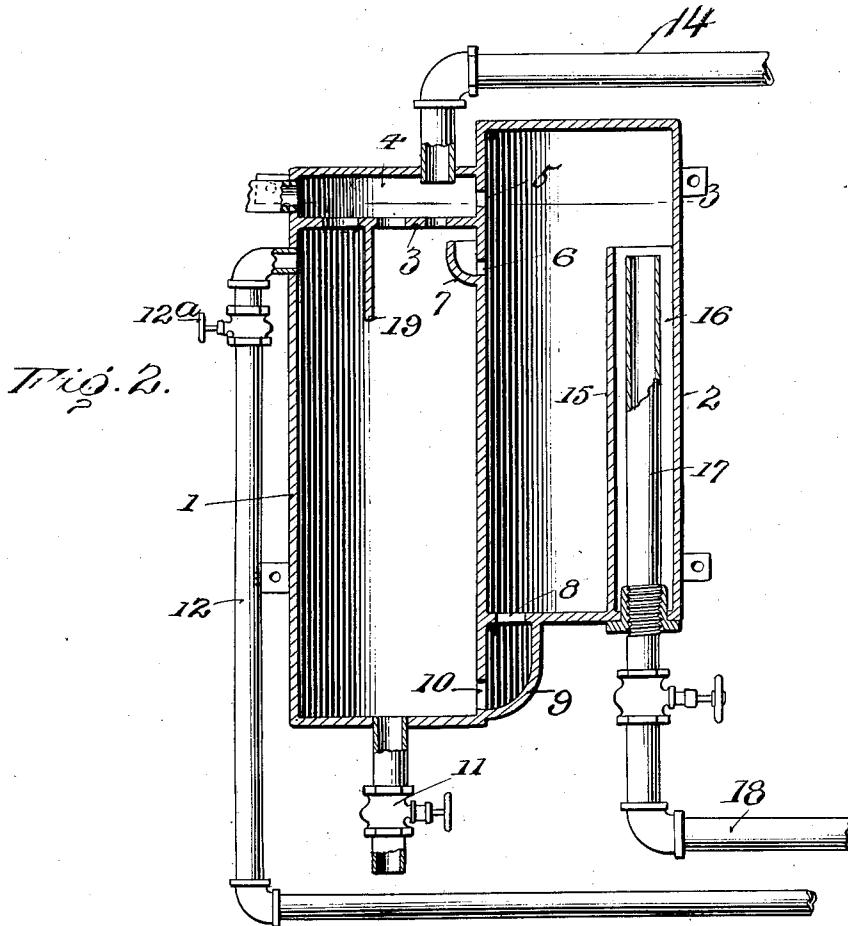
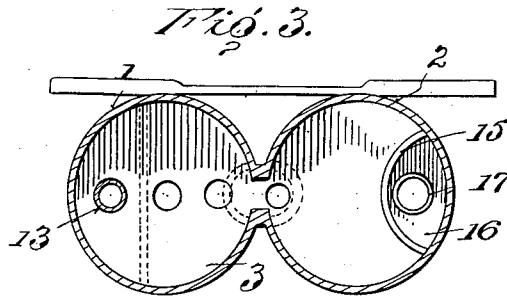
By

A. B. Lacy, Attorney

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Inventor

A. N. Jones

Witnesses

J. M. Woodson
W. N. Woodson

By

W. H. R. Racy, Attorney

UNITED STATES PATENT OFFICE.

ADONIVAM N. JONES, OF WICHITA, KANSAS.

BOILER-CLEANER AND FEED-WATER HEATER.

934,314.

Specification of Letters Patent. Patented Sept. 14, 1909.

Application filed December 28, 1908. Serial No. 469,682.

To all whom it may concern:

Be it known that I, ADONIVAM N. JONES, a citizen of the United States, residing at Wichita, in the county of Sedgwick and State of Kansas, have invented certain new and useful Improvements in Boiler-Cleaners and Feed-Water Heaters, of which the following is a specification.

The present invention relates to an improved device for purifying the water of steam boilers to prevent the formation of scale within the boiler, and the object of the invention is the provision of a boiler cleaner of this character which embodies a novel construction for collecting the sediment from the water in drums from which it can be blown off at intervals.

The invention further contemplates a boiler cleaner which acts upon the feed water before it enters the boiler, and also acts upon the water after it has entered the boiler and been raised to a high temperature, thereby removing not only the heavier particles, but also the scale-making materials such as the sulfates and alkalines.

With these and other objects in view that will more fully appear as the description proceeds, the invention consists in certain constructions and arrangements of the parts that I shall hereinafter fully describe and claim.

For a full understanding of the invention and the merits thereof and to acquire a knowledge of the details of construction, reference is to be had to the following description and accompanying drawings, in which:

Figure 1 is a side elevation of a boiler having the improved boiler cleaner and feed water heater applied thereto; Fig. 2 is a vertical sectional view through the device when detached; and, Fig. 3 is a horizontal sectional view on the line 3-3 of Fig. 2.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawings by the same reference characters.

Referring to the drawings, the numerals 1 and 2 designate a pair of upright sediment drums which are arranged side by side, the drum 2 having a slightly higher elevation than the drum 1. A transverse partition 3 extends across the upper portion of the sediment drum 1 so that a steam chamber 4 is formed in the top thereof, the said steam chamber communicating with the main por-

tion of the sediment drum through suitable openings or perforations in the partition 3. The upper portion of the second sediment drum 2 communicates with the steam chamber 4 through an opening 5 and also with the main portion of the drum 1 through an opening 6 under the partition 3, a curved wall 7 being located in front of the opening 6, so that water will pass quietly from the drum 1 to the drum 2 without producing any agitation such as would tend to stir up the sediment. The bottom of the drum 2 is provided adjacent the drum 1 with a discharge opening 8 leading to a chamber 9 which communicates with the bottom of the drum 1 through an opening 10 in the side thereof. The sediment which has collected within the drum 2 is designed to pass through the chamber 9 into the drum 1 from which it can be discharged through the blow-off valve 11. The feed water supply pipe 12 leading from a pump or injector enters the upper portion of the sediment drum 1 slightly below the partition 3, the flow of water through the pipe being controlled by a valve 12^a.

Opening into the steam chamber 4 upon one side thereof is a surface blow-off pipe 13 which communicates with the boiler at substantially the water line thereof, a valve 13^a being interposed in the length of the pipe to control the passage of water there-through. A pipe 14 which leads from the highest portion of the boiler or steam dome of the boiler, enters the top of drum 1 so as to open into the steam chamber 4, the said pipe being designed to convey live steam to the drum and being provided with a valve 14^a.

A vertical partition 15 is formed within the second sediment drum 2 and provides a hot water well 16 which receives a stand-pipe 17, the lower end of the stand-pipe passing through the bottom of the drum and communicating with a return pipe 18 which leads to the bottom of the boiler, a valve 18^a being provided for controlling the flow through the return pipe.

When supplying the boiler with feed water, the valve 14^a of the steam pipe is closed and the valves 12^a, 13^a and 18^a opened. The feed water which is then forced into the boiler by means of a pump or injector of any suitable type, being comparatively cooler than the superheated water from the boiler, and consequently heavier, drops to the bottom of the first drum 1 immediately

upon its entrance. This feed water is, however, rapidly heated by the dry steam and hot water, and quickly rises within the drum, precipitating any solids that may be held in suspension, such as clay, sand or the like. The water then enters the second drum 2 where another precipitation occurs, by which those lighter solids not already deposited are removed, and the feed water which has become heated enters the stand-pipe and is carried to the boiler through the return pipe 18. During the normal operation of the boiler, the valve 12^a of the feed water supply pipe is closed, as is the valve 14^a of the steam pipe, the valves 13^a and 18^a being opened. The water within the boiler is raised to such a high temperature as to release the scale-making materials such as the sulfates and alkalines which, unless kept in motion by the rapid circulation of the whole body of water and drawn out with it, will precipitate and cause the well-known scale formations which result in enlarged coal bills, an increase in labor and repair expenses, and finally in ruined boilers. By the present device, the water is caused to pass through the surface blow-off pipe 13 by the force of the dry steam acting on the principle of the injector, and the water is caused to circulate through the sediment drums where the double precipitation removes the solvent scale-matter that is soluble only at a high temperature under pressure, the cleansed water being returned to the boiler ready for full and efficient evaporation. Attention may be here directed to the fact that a baffle plate 19 projects downwardly from the partition 3 into the sediment drum 1 upon one side of the mouth of the surface blow-off pipe 13, the said baffle plate serving to prevent the water entering the drum through the pipe from passing directly over to the opening 6 and into the second drum 2, and also preventing the water thus entering the drum from producing any agitation such as would interfere with the precipitation of the sediment. This cleansing process is continuous, and as the speed of circulation varies directly with the steam pressure, it is able to accommodate itself to all demands, the higher the pressure and greater the evaporation, the more rapid the circulation and the faster the cleansing process.

This device not only accelerates the circulation already existing in the boiler and prevents the formation of new scales, but also softens the old scales by removing the chemical constituents which are the basis of their hardness, and so further increases the efficiency of the boiler.

The sediment and impurities precipitated in the drums may be blown off, at such intervals as the character of the water demands, by closing all of the valves except

the valve 14^a in the steam pipe, and then opening the blow-off valve 11.

It will thus be obvious that I have provided an extremely efficient boiler cleaner and feed water heater which both acts upon the feed water before it enters the boiler, and also acts upon the water after it has entered the boiler and been raised to a high temperature, and thereby not only removes the coarser particles, but also the finer particles and the scale-making materials.

Having thus described the invention, what I claim is:

1. In a boiler cleaner, the combination of a boiler, a sediment drum, a partition forming a well within the drum, a stand-pipe arranged within the well, a return pipe leading from the stand-pipe to the bottom of the boiler, means for establishing communication between the drum and the water line of the boiler, and means for drawing off sediment from the drum.

2. In a boiler cleaner, the combination of a boiler, a pair of sediment drums arranged side by side and communicating with each other, a pipe leading from one of the drums to the water line of the boiler, a partition forming a well within the opposite drum, a stand-pipe arranged within the well, and a return pipe leading from the stand-pipe to the bottom of the boiler.

3. In a boiler cleaner, the combination of a boiler, a pair of sediment drums arranged side by side at a different elevation and communicating with each other, a passage being provided for leading sediment from the bottom of the higher drum to the lower drum, means for drawing off sediment from the lower drum, a pipe leading from the lower drum to the water line of the boiler, a stand-pipe within the upper drum, and a pipe leading from the stand-pipe to the bottom of the boiler.

4. In a boiler cleaner, the combination of a boiler, a pair of sediment drums in communication with each other, a perforated partition extending across the upper portion of one of the sediment drums and forming a steam chamber in the top thereof, a pipe leading from the steam chamber to the upper portion of the boiler, a pipe leading from the water line of the boiler and entering the main portion of the said sediment drum below the steam chamber, a stand-pipe in the opposite sediment drum, a pipe leading from the stand-pipe to the bottom of the boiler, and a blow-off valve for withdrawing sediment from the sediment drums.

5. In a boiler cleaner, the combination of a boiler, a pair of sediment drums arranged side by side at a different elevation and communicating with each other, a passage being provided for leading sediment from the bottom of the upper sediment drum to the lower sediment drum, a blow-off valve ap-

plied to the bottom of the lower sediment
drum, a perforated partition forming a
steam chamber in the top of the lower sedi-
ment drum, a feed water supply pipe com-
5 municating with the lower sediment drum
below the steam chamber, a steam pipe lead-
ing from the steam chamber to the upper
portion of the boiler, a surface blow-off pipe
leading from the water line of the boiler to
13 the lower drum and communicating with
the same under the steam chamber, a parti-

tion forming a well in the upper sediment
drum, a stand-pipe arranged within the well,
and a return pipe leading from the stand-
pipe to the bottom of the boiler.

15

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

ADONIVAM N. JONES.

Witnesses:

GEO. W. CAUDLE,
JAMES M. PIPER.