DE LOS E. HIBNER.

BOILER FLUE CLEANER SYSTEM.

APPLICATION FILED JAN. 11, 1912.

1,041,079.

Patented Oct. 15, 1912.

2 SHEETS—SHEET 1.

Fig. 1.

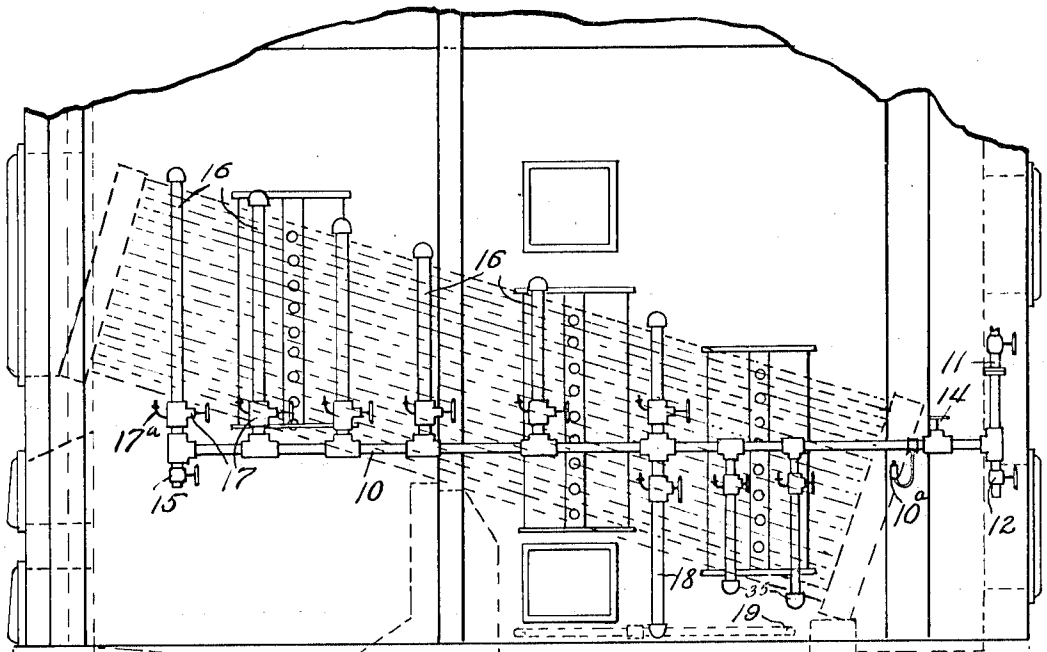
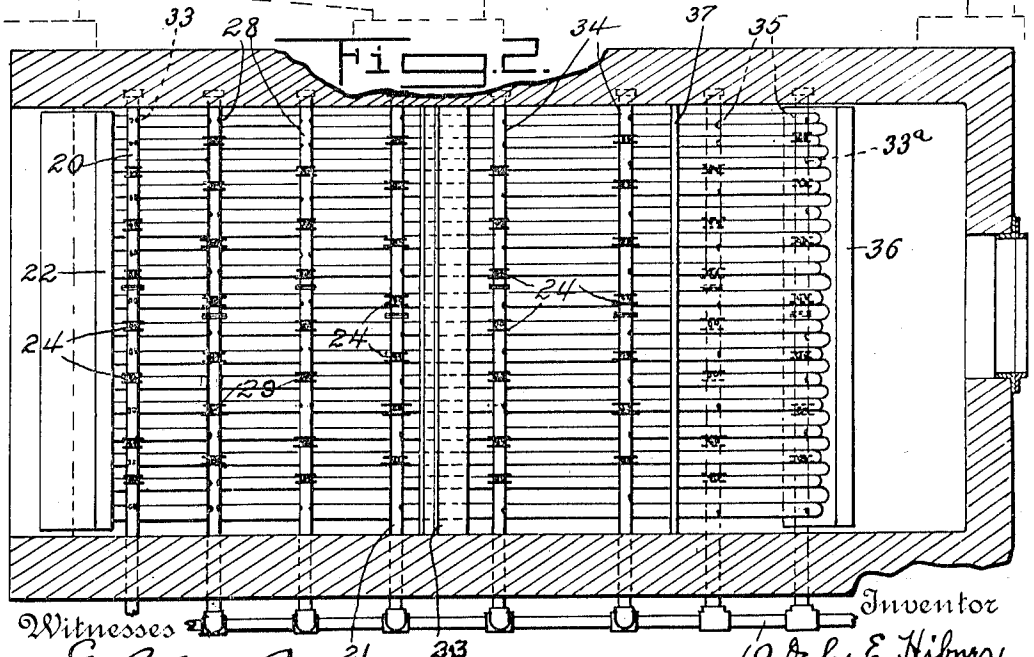


Fig. 2.



Witnesses

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2 SHEETS—SHEET 2.

Fig. 3.

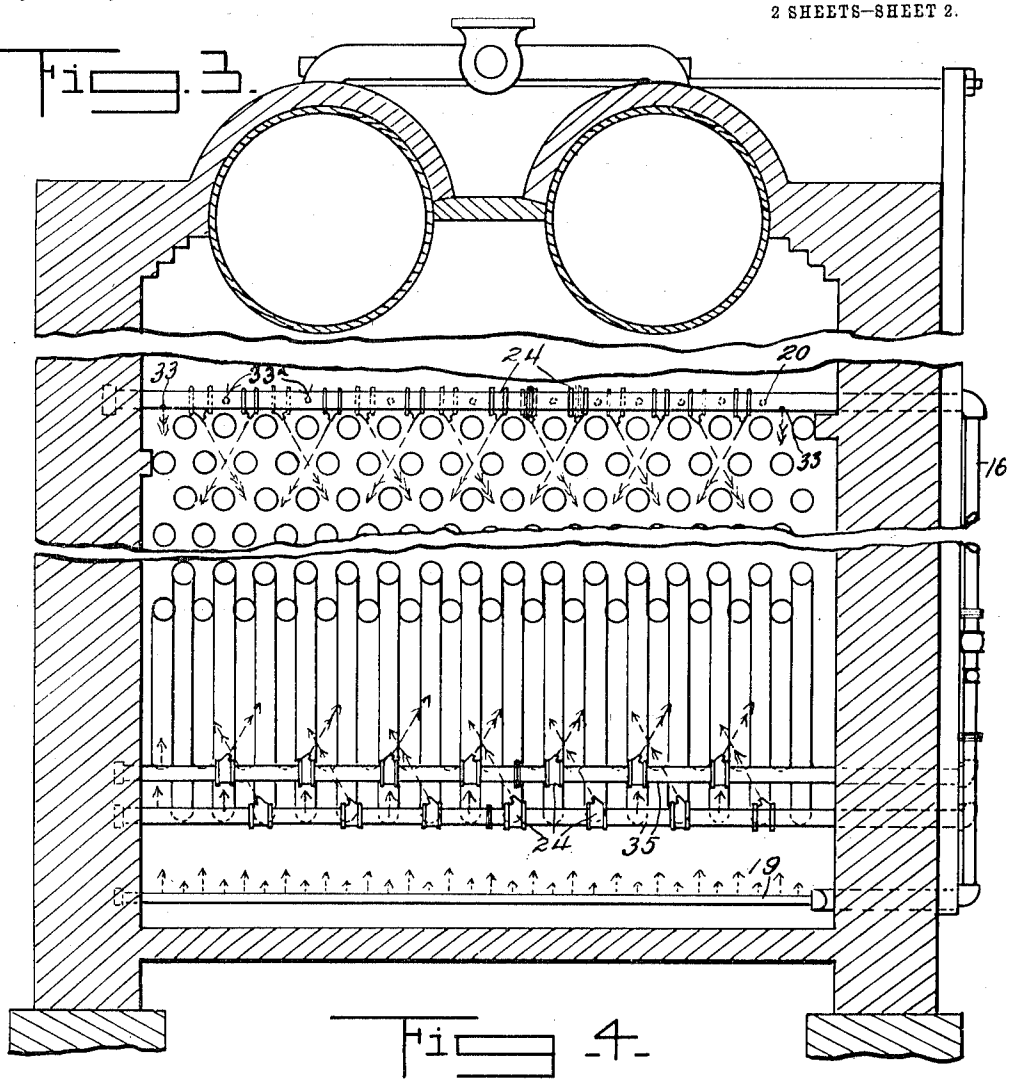


Fig. 4.

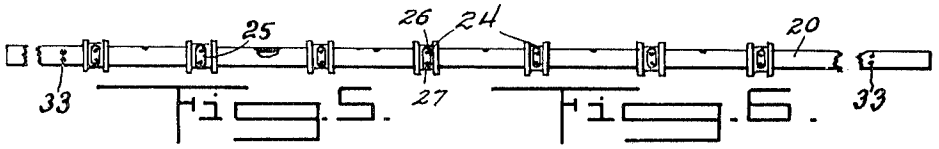
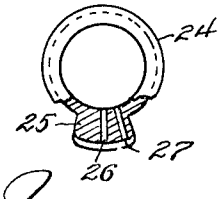
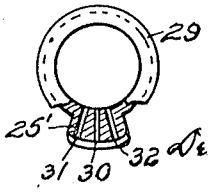


Fig. 5.

Fig. 6.





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UNITED STATES PATENT OFFICE.

DE LOS E. HIBNER, OF DUBOIS, PENNSYLVANIA, ASSIGNOR TO THE VULCAN SOOT CLEANER COMPANY OF PITTSBURG, PA., OF DUBOIS, PENNSYLVANIA, A CORPORATION OF NEW JERSEY.

BOILER-FLUE-CLEANER SYSTEM.

1,041,079. Specification of Letters Patent. Patented Oct. 15, 1912.

Application filed January 11, 1912. Serial No. 670,608.

To all whom it may concern:

Be it known that I, DE LOS E. HIBNER, a citizen of the United States, and residing at Dubois, in the county of Clearfield and State of Pennsylvania, have invented certain new and useful Improvements in Boiler-Flue-Cleaner Systems, of which the following is a specification.

This invention relates to certain new and useful improvements in boiler flue cleaner systems, and relates more particularly to that type of flue cleaners in which a fluid, as steam, is employed as a cleaning agent for removing soot from the flues and preventing an accumulation of soot on the flues.

The invention is an improvement upon flue cleaners of the type shown, described and claimed in Letters Patent #705,912, granted July 29, 1902 to William Eichelberger, for improvement in soot cleaners for boilers; also Letters Patent #801,858, Oct. 17, 1905, soot cleaners for boilers, granted to said William Eichelberger, and Letters Patent granted to me, February 21, 1911, #984,919, boiler flue cleaner systems.

My present invention has for its main object to provide for a projection of the steam or other cleaning agent among the tubes of a boiler, the distributing pipes, such as shown in the above-mentioned patents, being provided with nozzles of a specific construction which will effect a projection of the steam in a manner to effectually cleanse all of the tubes of the battery or boiler without requiring a manipulation of the distributing pipes so as to rotate same on their axes in order to project the steam at different angles throughout the battery of tubes or flues.

With the above and other objects in view which will more fully appear as the invention is hereinafter described and then particularly claimed, the invention consists in the novel construction, combination and arrangement of parts as will be hereinafter more specifically described and then claimed, and in describing the invention in detail, reference will be had to the accompanying drawings illustrating a preferred embodiment of the invention, and wherein like numerals will be employed for indicating like parts throughout the different views of the drawings, in which:

Figure 1 is a view in elevation with the boiler setting broken away, showing a flue cleaner system in accordance with my invention, it being understood that in practice, the branch pipes and feed pipe are outside the boiler setting as shown in Fig. 2. Fig. 2 is a horizontal sectional view of a boiler setting showing a plan of the cleaner system installed in the boiler. Fig. 3 is a transverse vertical sectional view of a boiler and its setting, such as shown in Figs. 1 and 2, illustrating the cleaner system in position, and showing the manner in which the steam is projected between the flues or tubes. Fig. 4 is an inverted detail plan view of one of the distributing pipes. Fig. 5 is an enlarged view in elevation of a portion of one of the distributing pipes, showing one of the nozzles, the latter being partially in section and illustrating a two-way discharge, and, Fig. 6 is a similar view illustrating a three-way discharge.

The system is illustrated as applied to a horizontal water tube boiler of the well-known B and W type. In general, it comprises a feed line or pipe 10, connected at one end to a steam supply 11, which latter is provided with a suitable drain valve as 12. In the feed pipe adjacent the supply line 11 is a shut-off valve 14. The feed line is preferably provided at or near its other end with a drain valve 15. Branch pipes 16 extend upwardly from the feed line at desired intervals, and are each provided with a shut-off valve 17 preferably located at a point close to the feed line. A branch pipe as 18 also connects with the feed line and extends downward into the combustion chamber of the furnace where it is provided with one or more suitable branch pipes 19 which serve to project a blast of steam toward the stack of the boiler in order to make a draft which will carry out through the stack, the soot which has been dislodged from the tubes, and the fine ash and soot that has accumulated in the combustion chamber. The feed line 10 is provided with an automatic drain valve 10^a and each of the shut-off valves 17 is provided with an automatic air valve 17^a as shown, and described and claimed in detail in my prior Patent #984,919 above referred to. The soot is dislodged from the tubes by means of distributing pipes which extend through the side of the boiler setting, cross-

ing directly above the boiler tubes, in first and middle pass and in under tubes in last pass, being suitably mounted at their other ends in the opposite side wall of the boiler setting.

This arrangement just described is a desirable one for a boiler as shown, but it will be evident that, where conditions may require, that the distributing pipes may terminate at or near the inside of the boiler setting and the branch pipes or lines may come down through the top of the boiler setting and connect to the distributing pipes. Such an alteration in the arrangement of the branch pipes and distributing pipes is necessary where the boilers are set in batteries of more than two, as it is obvious the intermediate boilers of the battery could not be reached from the sides as in the present illustration, but would have to be fed from the top.

So far as above described the system is substantially that embraced in the patents above noted. My present invention resides in the provision in the distributing pipes of specifically constructed nozzles, having discharge nipples with two or more outlets; the outlets in the nozzles being so disposed as to project the steam obliquely to the axial line of the distributing pipes, whereby necessity for rotating the pipes on their axes is obviated. It is understood that nozzles could be attached to the distributing pipes in a great many forms, differing in construction from the nozzles herein shown, and would produce the same results, utilizing the same art of blowing through the oblique space that obtains in all water tube boilers of the horizontal type.

The manner in which the steam is projected among the tubes or flues of the boiler will be better understood by reference particularly to Figs. 2 to 6 of the drawings, and with reference to Fig. 2 of the drawings, the distributing pipes 20 and 21 which are arranged respectively adjacent to the header 22 and to the baffle 23 are provided with nozzles 24 having nipples 25 which are provided with discharge ports 26 and 27 respectively. The port 26 is at direct right angles to the oblique line, and at such an angle as may be necessary to the axial line of the distributing pipe, and the outlet 27 is disposed at an angle of substantially 45°, blowing obliquely from the distributing pipe. This oblique line is approximately 60 degrees in horizontal water tube boilers of the Babcock & Wilcox type. In other makes of boilers of the horizontal water tube type, the oblique line may be of a different degree, and the angle of the discharge ports 26 and 27 will be made to conform to the angle of the oblique line between the tubes.

In these two distributing pipes 20 and 21, the outlet or discharge ports 26, in the nipples 25, discharge the steam adjacent to the header 22 and baffle 23 respectively; while the outlets 27 in the pipe 20, discharge at an angle of practically 45 degrees toward the baffle 23; while the similar outlets in the nozzles on distributing pipe 21 discharge in the opposite direction, but at the same angle toward the header 22.

The intermediate pipes 28 have interposed therein, nozzles similar to that illustrated and designated 29 in Fig. 6. The discharge nipples 25′ on these nozzles have three outlets or discharge ports designated 30, 31 and 32 respectively. These discharge ports in the nipples 25′ are arranged to blow in this oblique line from the distributing pipe, the port 30 blowing at right angles on this oblique line from the distributing pipe, and the ports 31 and 32 blowing each at 45 degrees from the distributing line, each in opposite directions; the discharge nipples are so set as to blow on this inclination obliquely from the distributing pipe in this make of boiler at an angle of substantially 60 degrees. It will be noted that the steam issuing from ports 31 and 32 in pipes 28 is projected in opposite directions, but at a corresponding angle of substantially 45 degrees; while the steam issuing from port 30 is projected downwardly at right angles to the oblique line, from the distributing pipe, the same as all other ports blow. Each distributing pipe is provided adjacent each end with ports 33, and between each pair of nozzles with ports 33ª. The two at the ends project the steam downward at approximately 45 degrees to the axis of the distributing pipe, there being on each end the two ports 33, in order to clean those tubes lying close to the boiler setting that are not reached by nozzles 24 and 29, and the ports 33ª that are between the nozzles project the steam downward and outward at an angle so as to clean the upper surface of the top row of tubes. Distributing pipes 20, 21, 34 and 35 have a row of these ports 33ª on one side only. Pipes 28 have a row on each side.

The pipes 34 arranged between baffle plates 23 and 37 have their nozzles 24 of the same form as above described for pipes 20 and 21, and blow on this incline the same as pipes 20 and 21; while the pipes 20, 21, 28 and 34 are located on the top tubes of the boiler. Pipes 35 with nozzles 24 are located in under the tubes in the last pass of the boiler between baffle 37 and header 36, but instead of blowing downward, blow upward, the nozzles being arranged on these pipes for such projection of the steam as on the other distributing pipes.

By the employment of the two and three-way discharge nipples, it will be observed that the steam will be projected along this oblique line, and at such angles as to thoroughly reach and pass on this oblique line

between all the rows of tubes. The projected line of the stream of the steam from one distributing pipe being intersected by the projecting steam from the adjacent distributing pipe, so as to effectually cleanse the tubes of accumulating soot; the angles of projection provided by the two and three-way arrangement of nozzles covering the entire battery of tubes or flues.

In installing systems of this character, the type of boiler being known, with number of tubes, number of tubes high, arrangement of baffles, etc., it is easily determined what amount of two-way and three-way nozzles will be required, the nozzles being generally cast with but two discharge ports therein, in the same plane as the oblique line between the tubes; the one making a direct right angle, the other an angle of 45° to this line, and for the three-way nozzle, the additional 45 degree port may be readily drilled therein.

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

1. In a flue cleaner system, a flue, a fluid distributing pipe, a feed pipe therefor and a supply pipe to which the feed pipe is connected, combined with a plurality of discharge nozzles interposed in the distributing pipe and arranged to discharge fluid at an oblique line with respect to the axis of the distributing pipe and flue.

2. In a flue cleaner system, a flue, a fluid distributing pipe, a feed pipe, a branch pipe connecting the distributing pipe to the feed pipe, and a plurality of nozzles interposed in the distributing pipe and each provided with an outlet disposed to discharge fluid at an oblique line to the line of axis of the distributing pipe and flue.

3. In a flue cleaner system a flue and distributing pipes arranged for cleaning the flue by fluid conducted to the flue through said pipes, a plurality of nozzles interposed in each pipe and having outlets discharging the fluid at an oblique angle to the axis of the pipe and flue.

4. In a flue cleaner system, a flue, a series of distributing pipes, connections with said pipes for supplying same with steam, and nozzles interposed in each pipe and each provided with an outlet disposed obliquely to the axis of the pipe and flue.

5. In a flue cleaner system, a flue, a distributing pipe, connections with said pipe for supplying same with steam, and nozzles interposed in the distributing pipe each having an outlet disposed to project the steam at an oblique angle to the axis of the pipe and flue.

6. In a flue cleaner system, a flue, a plurality of distributing pipes, connections for supplying said pipes with steam, and discharge nozzles carried by said pipes having outlets discharging at an oblique line to the axis of the pipes and flue, said nozzles disposed to have the lines of the streams discharged from the nozzles on one pipe intersect streams discharged from nozzles on an adjoining pipe.

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

DE LOS E. HIBNER.

Witnesses:
FREDERICK W. LINAKER,
CHARLES E. HAND.