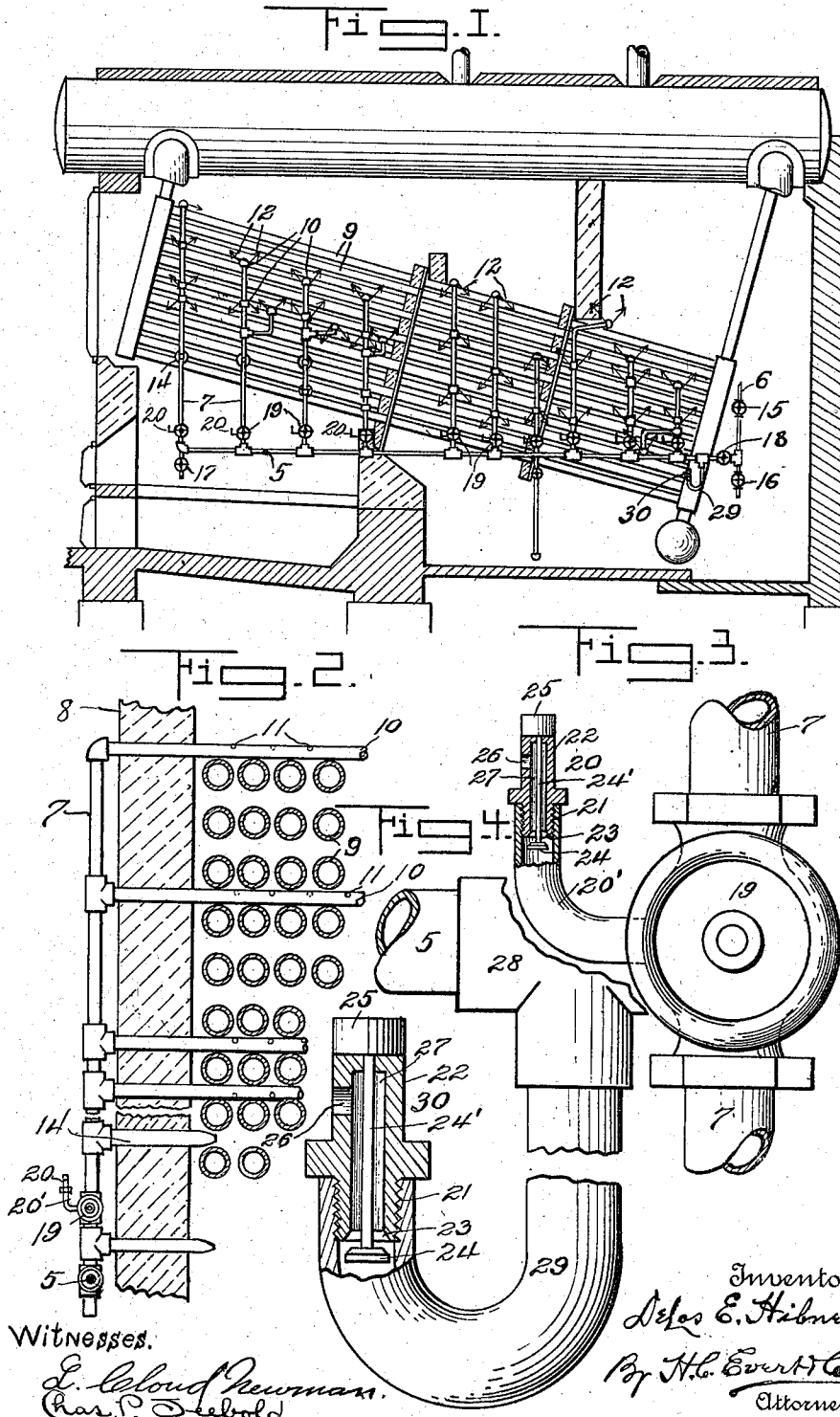


DE LOS E. HIBNER.
BOILER FLUE CLEANER SYSTEM.
APPLICATION FILED NOV. 15, 1910.

984,919.

Patented Feb. 21, 1911.



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.

984,919.

Specification of Letters Patent. Patented Feb. 21, 1911.

Application filed November 15, 1910. Serial No. 592,498.

To all whom it may concern:

Be it known that I, DE LOS E. HIBNER, a citizen of the United States of America, 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, reference being had therein to the accompanying drawing.

This invention relates to certain new and useful improvements in boiler flue cleaner systems and relates more specifically to that type of flue cleaners in which steam is employed for removing the accumulated soot from the boiler flues.

Types of flue cleaner systems to which the present invention is particularly adapted are shown, described and claimed in Letters Patent granted to William Eichelberger, No. 705,912, soot cleaner for boilers, July 29, 1902; Letters Patent No. 801,858, soot cleaner for boilers, Oct. 17, 1905 and Letters Patent No. 858,334, fuel economizer soot cleaner, June 25, 1907.

The flue cleaners shown and described in the above mentioned patents each embody a series of distributing pipes arranged among the boiler flues, with branch pipes each feeding one or more of the distributing pipes, and each branch pipe connected to a common feed pipe which is in communication with the steam supply. The distributing pipes project through the boiler setting and are all therefore more or less within the heat zone of the furnace, whereas the branch pipes, together with the main feed pipe and the supply pipe are located outside the boiler setting and are not subjected to the same degree of heat as the distributing pipes. The systems referred to have been in actual operation for a number of years and work admirably in accomplishing the results sought, but it has been found in practice, that oftentimes the branch pipes which, as stated, are located outside the boiler setting, deteriorate rapidly whereas the distributing pipes during the same length of service show no deterioration whatever.

Since both sets of pipes when the system is in operation are in communication with a common supply, the cause for one set of pipes remaining uninjured and the other set of pipes being rendered worthless, sometimes in a comparatively short space of time, has

been a worrying and expensive problem to the installers of the system for a considerable time. I have discovered that the reason for this unequal deterioration is due to the fact that when the valves in the branch pipes are closed and the supply of steam thereby shut off from these pipes and from the distributing pipes, that the branch pipes being outside the boiler setting cool off while the distributing pipes being all more or less within the heat zone of the furnace are prevented from cooling to any appreciable extent. As a result, the steam which remains in the branch pipes condenses as the pipes cool and sets up a vacuum tending to draw in through the distributing pipes sulfurous fumes from the fuel in the furnace; as the sulfur comes in contact with the condensation, sulfuric acid is formed in the branch pipes and the latter very rapidly corrode under the action of this acid and are soon rendered worthless especially where the fuel employed contains a good percentage of sulfur.

It is the object of the present invention to wholly overcome the formation of the vacuum in the branch pipes and the resultant damaging effects to cleaner systems of the type stated, and a further object is to provide an automatic drain or tell tale valve for the feed pipe of the system by means of which a vacuum is prevented from forming in the feed pipe and which will act to drain the system should the main shut off valve leak or be imperfectly closed by the operator.

A practical embodiment of the invention is illustrated in the accompanying drawing wherein the same is shown applied to a cleaner system such as is shown in Patents 705,912 and 801,858 heretofore referred to, it being understood however that I do not limit myself to the specific form of cleaner since the invention may be applied to any cleaner system to which it may be applicable.

In the drawings:—Figure 1 is a sectional view through a boiler setting showing a cleaner system of the type referred to applied to the boiler and equipped with my invention, it being understood that the branch pipes and feed pipe are in practice outside the boiler setting, as shown in Fig. 2. Fig. 2 is a transverse sectional view

of a part of a boiler and setting showing the manner in which the distributing pipes extend among the tubes of the boiler. Fig. 3 is an enlarged detail plan of one of the
 5 branch pipe shut off valves, showing in section the automatic air valve constituting one feature of my invention, and, Fig. 4 is an enlarged sectional view of the automatic drain or tell tale valve constituting the
 10 other feature of my invention.

The flue cleaner system of the type shown embodies a feed pipe 5, one end of which is in communication with a suitable steam supply 6, and in communication with the
 15 feed pipe 5 is a plurality of branch pipes 7. The feed pipe 5 is arranged substantially horizontal and the branch pipes 7 substantially vertical, both outside the boiler setting 8. Extending inwardly from the branch
 20 pipes among the boiler flues 9 are a series of distributing pipes 10 each provided with perforations 11 which are so disposed as to project the steam from the pipes toward the flues 9 at desired angles. The manner in
 25 which the perforations are arranged in the different pipes is shown by arrows 12 in Fig. 1. It is the general practice to provide short distributing pipes or nozzles 14 at the points where such distributing pipes are
 30 in juxtaposition, to the fire box of the furnace, said distributing pipes extending across the furnace at this point would be subjected to the intense heat from the fire box and liable to be burned out. A shut off valve 15
 35 is provided in the steam supply pipe 6, and said pipe is also extended below the feed pipe and provided with a drain cock 16. A similar drain cock 17 is provided at the outer end of the feed pipe, and a shut off
 40 valve 18 is provided in the feed pipe at a point adjacent to the steam supply pipe 6, and a shut off valve 19 is provided in each distributing pipe 7 near the feed pipe 5.

As above briefly described, the system is
 45 such as is shown and claimed in the patents heretofore referred to, and as installed in actual practice, and it is thought no further detail description is necessary.

My invention, as heretofore stated, resides in means for preventing the creation
 50 of a vacuum in the branch pipes and the consequent corrosion and deterioration of same, and in the tell tale or automatic drain means for the feed pipe and steam supply line. To accomplish the first stated object
 55 of my invention, I provide each of the shut off valves 19 with an automatic air valve 20. This I apply by tapping an L-pipe 20 into the body of each valve 19, the vertical
 60 arm of which L is interiorly-threaded to receive the exteriorly-threaded nipple 21 on the lower end of the valve 20. The air valve 20 consists of a cored body 22 having a valve seat 23 on its lower end against
 65 which the valve 24 seats under steam pres-

sure. The valve stem 24' extends through the cored body and is provided on its upper end with a head 25 which seats on the upper end of the valve body when the valve is unseated. The opening in the upper end
 70 of the valve body is small, being only large enough to receive the stem so that guide for the stem is formed at the upper end of the body. A port 26 is provided in one side of the valve body, leading into the bore 27
 75 of said body.

The automatic drain or tell tale valve is interposed in the feed pipe 5, and this I generally accomplish by providing a T 28 in said feed pipe and connecting a return
 80 bend pipe 29 to said T. In the upper end of the free end of this return bend I mount the automatic drain or tell tale valve 30 which in construction is the same as the air valve though generally somewhat larger in
 85 size. Aside from the general designating numerals therefor, the same reference numerals have been applied to the constructive features of the two valves.

In the operation of a cleaner system such
 90 as shown, the operator when he desires to use the system, first opens drain cock 16 and then opens valve 15 in the supply pipe 6, allowing steam to escape until perfectly dry steam appears, when he closes drain 16
 95 and opens valve 18 so as to allow steam to flow into the feed pipe 5. Valves 19 upon being opened permits the steam to flow into the branch pipes 7 to the distributing pipes 10 and be discharged therefrom to remove
 100 the soot from the flues. With my valves as described applied, steam entering the feed pipe past valve 18 enters return bend 29 and closes the valve head of valve 30 so as to prevent escape of steam. Similarly when
 105 valve 19 is opened steam enters the L pipe 20' and seats valve 24 preventing escape of steam through valve 20. When however, shut off valves 15 and 18 are closed, the pressure of steam against the valve heads being
 110 relieved, the valves immediately open by gravity and air flowing in through port 26 of valve 20 prevents the formation of a vacuum due to condensation in the pipes 7 and obviating the otherwise in draft through
 115 the distributing pipes to the branch pipes, so that no pipe destroying substance is drawn into said pipes. The automatic drain or tell tale valve 30 being placed in the feed pipe 5 in advance of the shut off
 120 valve 18 acts to effectually drain the line should the valve 18 leak or be imperfectly closed.

What I claim is:

1. In combination in a flue cleaner system, 125 a distributing pipe extending among the tubes of the boiler, a branch pipe for supplying cleaning fluid to the distributing pipe, a feed pipe for said branch pipe, a supply pipe for said feed pipe, a shut off valve in the 130

supply pipe, a shut off valve in the feed pipe, an automatic drain or tell-tale valve in the feed pipe in advance of the shut off valve in said pipe, and an automatic air valve in the branch pipe between the feed pipe and the distributing pipe.

2. In a flue cleaner system, the combination with a feed pipe and a branch pipe communicating therewith, of an automatic air valve interposed in the branch pipe, and an automatic drain valve interposed in the feed pipe.

3. In a flue cleaner system of the type described, the combination with a steam supply pipe, a steam feed pipe communicating therewith, a plurality of steam branch pipes communicating with the feed pipe, and distributing pipes communicating with the branch pipes, of means interposed in the branch pipes for preventing the formation of a vacuum in said pipes when the supply of steam thereto is shut off.

4. In a flue cleaner system of the type described, the combination with a steam supply pipe, a feed pipe in communication therewith, a shut off valve in the supply pipe, and a shut off valve in the feed pipe, of an automatic drain valve in the feed pipe in advance of the shut off valve in said pipe.

5. In a flue cleaner system of the type described, a feed pipe, a supply pipe therefor, branch pipes communicating with the feed pipe, distributing pipes communicating with the branch pipes, and automatic means in the

branch pipes between the distributing pipes and the feed pipe for preventing the formation of a vacuum in the branch pipes when the steam is shut off therefrom.

6. In flue cleaner systems having a steam supply pipe, a feed pipe connected thereto and a branch pipe connected to the feed pipe, an automatic air valve in the branch pipe and an automatic drain valve in the feed pipe.

7. In flue cleaner systems having pipes arranged for cleaning the flues by fluid conducted to the flues through said pipes, an automatic air valve for admitting air to certain of said pipes when the cleaning fluid has been shut off therefrom, and an automatic drain valve for draining the pipes while the cleaning fluid is shut off therefrom.

8. In a flue cleaner system, a fluid distributing pipe, a feed pipe therefor, a supply pipe to which the feed pipe is connected, a shut off valve in the supply pipe, a shut off valve in the feed pipe between the distributing pipe and the supply pipe, and an automatically-operating drain valve in the feed pipe between the shut off valve of said pipe and the distributing pipe.

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

DE LOS E. HIBNER.

Witnesses:

EDWARD D. SCHWEM,
CHARLES E. HAND.