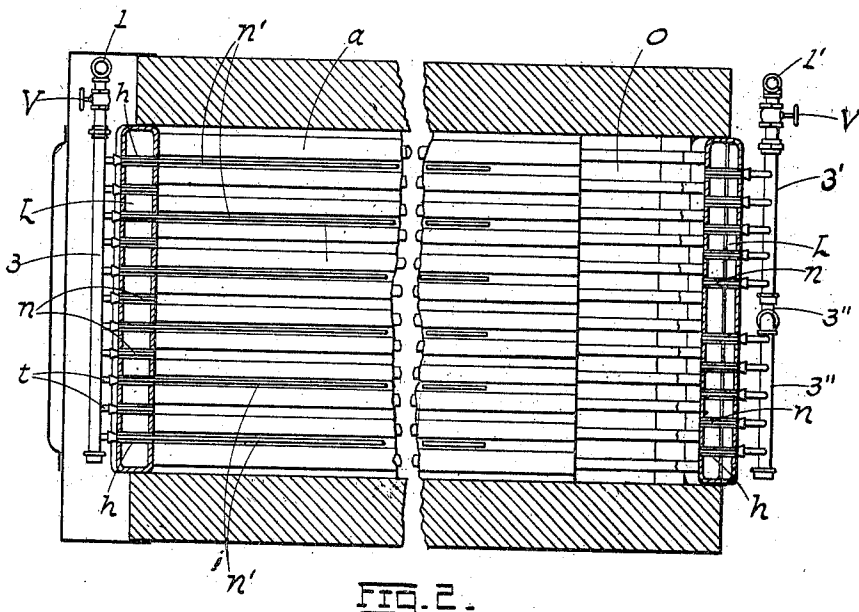
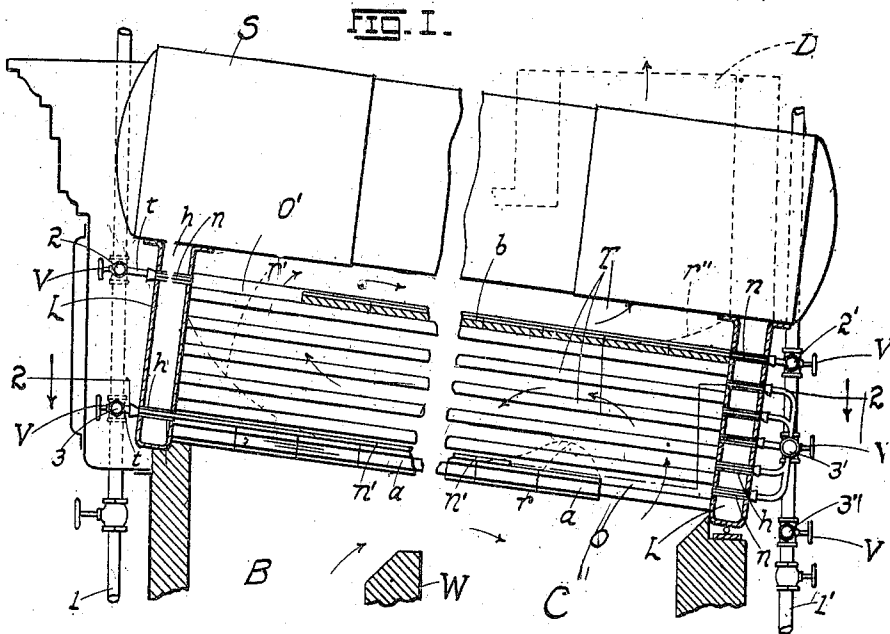


L. J. BAYER.
SOOT BOILER CLEANER.
APPLICATION FILED APR. 6, 1912.

1,032,583.

Patented July 16, 1912.

2 SHEETS-SHEET 1.



WITNESSES:

Harry A. Reimes.
T. Evans

INVENTOR.

Leo John Bayer.

BY

Emmett
ATTORNEY.

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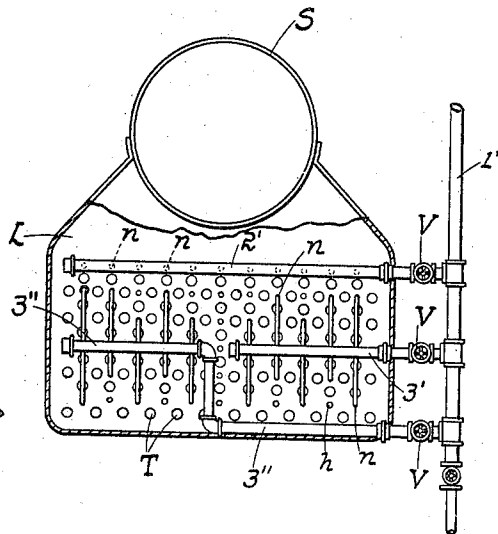
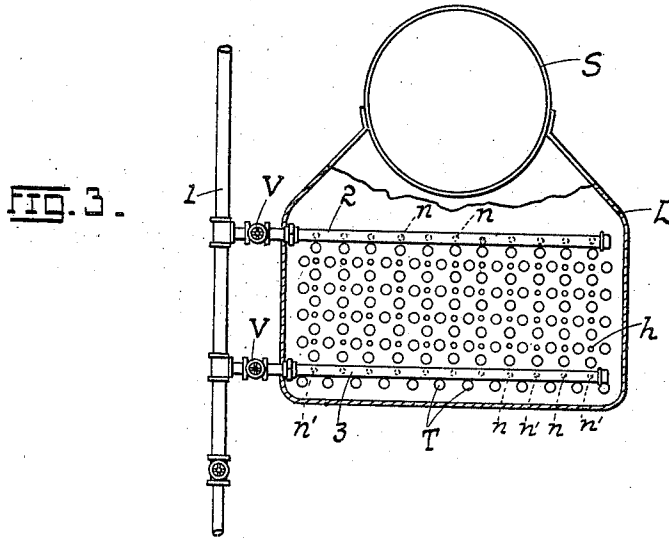


FIG. 4.

WITNESSES:

Harry A. Reimes,
T. Evans.

INVENTOR.

Leo John Bayer.

BY

Ernest Loren
 ATTORNEY.

UNITED STATES PATENT OFFICE.

LEO JNO. BAYER, OF ST. LOUIS, MISSOURI, ASSIGNOR TO BAYER STEAM SOOT BLOWER COMPANY, OF ST. LOUIS, MISSOURI, A CORPORATION OF MISSOURI.

SOOT BOILER-CLEANER.

1,032,583.

Specification of Letters Patent.

Patented July 16, 1912.

Application filed April 6, 1912. Serial No. 688,946.

To all whom it may concern:

Be it known that I, LEO JOHN BAYER, a citizen of the United States, residing at St. Louis, State of Missouri, have invented certain new and useful Improvements in Soot Boiler-Cleaners, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention has relation to improvements in soot boiler-cleaners; and it consists in the novel details of construction more fully set forth in the specification and pointed out in the claims.

In the drawings, Figure 1 is a sectional side elevation of a conventional water-tube boiler of the Heine type, showing my invention applied thereto; Fig. 2 is a horizontal section on the line 2-2 of Fig. 1; Fig. 3 is a front elevation of the boiler with my invention applied; and Fig. 4 is a rear elevation of the boiler showing the headers and nozzles leading therefrom.

The present invention is an improvement on the boiler-cleaner forming the subject-matter of United States Letters Patent numbered 919,680, issued under date of April 27, 1909, to Frank X. Bayer, and has for its object to extend the principle of operation therein contemplated; to boilers of the Heine-type wherein there exists the tendency of soot to accumulate on the end of the lower baffle plate or wall adjacent the passage-way leading from the combustion chamber at the rear of the bridge-wall. In many boilers of this type considerable soot, ashes and other solid material is precipitated on the lower baffle. It may be stated as a general rule that in all boilers of the Heine type baffled horizontally at the bottom and top of the water-tube section, there are at least three zones of precipitation in which soot, ashes, and solid matter tends to accumulate, namely at the rear end of the lower baffle, at the front of the lower baffle behind the front water-leg, and at the rear of the upper baffle nearest the stack. In the patent referred to, the several zones are well taken care of, except in cases of unusually long boilers, or where there has been a failure to blow a boiler as often as conditions require. In the latter case the solid matter precipitated on the rear end of the lower baffle, cakes or becomes so compact that it can not be dislodged by the steam

jets directed through the front water-leg above the baffle, and in the former case the jets can not reach the material so precipitated. It is therefore the object of my present improvement to so qualify the construction shown in said patent, as to insure the blowing of every portion of a water-tube boiler of the type here referred to and baffled as here indicated. In detail the invention may be described as follows:—

Referring to the drawings, S represents a boiler shell having terminal water-legs L, L, connected by circulating water-tubes T. Extending over the fire-box B, and above the bridge-wall W, and a suitable distance over the rear combustion chamber C, and disposed at the bottom of the water-tubes T, is a deflecting wall or horizontal baffle *a*, said baffle terminating so as to leave an opening or pass *o* between it and the rear water-leg as well understood in the art. Disposed at the top of the water-tube section and extending from the rear water-leg forward a suitable distance (so as to leave a pass *o'* between it and the front water-leg) is a second baffle *b*. Leading from a steam supply pipe 1, in front of the front water-leg, and disposed at proper elevations are headers 2, 3, from which lead branches *t* to which are secured nozzles *n* which in turn pass through the hollow stay-bolts *h* entering into the general construction of the water-leg. The nozzles *n* of the header 2 discharge below the shell S behind the front water-leg, and the nozzles *n* of the header 3 discharge above the baffle *a* behind the front water-leg. In the rear of the boiler I provide a steam supply pipe 1', from which leads a branch or header 2' the nozzles *n* whereof discharge above the baffle *b* in front of the rear water-leg, and branches or headers 3', 3'', the nozzles *n* whereof discharge below the baffle *b* into the spaces between the tubes T in front of the rear water-leg. The several headers are provided with conventional control valves V not necessary to describe in detail, and may be blown successively or jointly. The pipes 1, 1', may lead from a common steam supply pipe (not shown).

In the operation of the boiler-furnace, solid materials not carried out of the stack by the draft will partly adhere to the tubes and shell, and partly precipitate on the baffles *a*, *b*, and naturally the boiler must be

blown or cleaned from time to time, to cleanse the surfaces of the accumulations referred to. As previously stated, there are substantially three zones of precipitation from which the material must be dislodged, to wit: the zone r at the rear of the baffle a adjacent the pass o ; the zone r' at the front of the baffle a behind the front water-leg L ; and the zone r'' at the rear of the top baffle b in front of the rear water-leg. The nozzles n as described above take care of the zones r' , r'' , under normal working conditions; but for extra long boilers, or even in boilers of average length if not blown at regular intervals the zone r may so fill up with precipitated material (soot, ashes, cinders) as to resist dislodgment by the steam jets issuing from the bottom set of front nozzles. I accordingly make provision to blow the accumulations in the zone r by means of nozzles which discharge at this zone, the limits whereof are substantially as indicated by the dotted line r , such line representing the pile which accumulates at this point. I prefer to lead these nozzles through the hollow stay-bolts of the front water-leg in the same manner as the nozzles n , and in the preferred embodiment of the invention the said nozzles are in the form of long tubes n' leading from the branch or header 3 through the front water-leg above the baffle a , the terminals of the nozzles n' being at the front of the zone r where they dislodge the material accumulated therein. The nozzles n' preferably alternate with the short nozzles n (Fig. 2), constituting in effect mere rearward extensions or prolongations of the nozzles n .

When the several nozzles are blown the accumulated soot, ashes and solid materials are dislodged from the tubes T and shell S , and from the baffles a , b , and kept agitated so as to remain in suspension in the current produced by the draft, such current taking the path from the fire-box substantially as indicated by the arrows (Fig. 1), that is to say through the pass o diagonally across the tubes T , through the pass o' under the shell S and out through the stack D . The heaviest particles will naturally be precipitated in the zone r , that being the zone of initial precipitation; the next lighter will precipi-

tate in the zone r' ; the next will precipitate in the zone r'' , the very lightest particles and gases passing on to the stack D . Whatever accumulates on the tubes T and shell S , may be said to be the result of interception rather than precipitation, although the line is not very clearly defined. The branches t may be considered as forming part of the nozzles n , n' .

Having described my invention, what I claim is:—

1. In combination with a boiler having a water-tube section comprising circulating water-tubes communicating with the boiler, said tubes being provided with a bottom horizontal baffle terminating at the rear a suitable distance from the adjacent ends of the tubes, a furnace provided with a fire-box and a combustion chamber beneath the baffle aforesaid, and suitable cleaning nozzles discharging rearwardly above the baffle at the zone of initial precipitation of suspended impurities carried by the gases discharged from the combustion chamber.

2. In combination with a boiler having a shell and a water-tube section comprising a front and rear water-leg and connecting circulating tubes, a bottom horizontal baffle extending from the front water-leg to a point removed a suitable distance from the rear water-leg, a combustion chamber below the bottom baffle, a top horizontal baffle extending from the rear water-leg to a point removed a suitable distance from the front water-leg, headers provided with nozzles discharging through the front water-leg respectively at points behind said water-leg beneath the shell and above the bottom baffle, and above said baffle at points in the region of initial precipitation of suspended impurities carried by the gases from the combustion chamber, and headers provided with nozzles discharging through the rear water-leg respectively above the top baffle, and into the spaces between the tubes below said baffle.

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

LEO JNO. BAYER.

Witnesses:

EMIL STAREK,
T. EVANS.