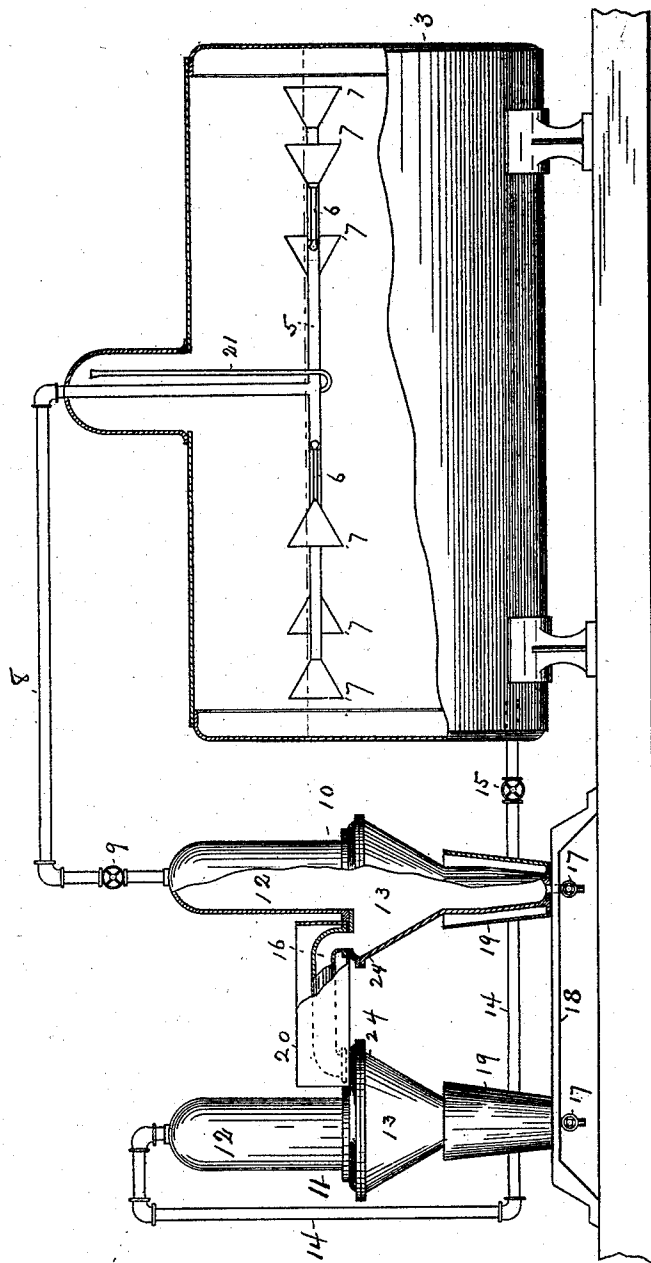


(No Model.)

J. J. MINER.
AUTOMATIC BOILER CLEANER.

No. 498,854.

Patented June 6, 1893.



WITNESSES:

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UNITED STATES PATENT OFFICE.

JOHN J. MINER, OF FORT WAYNE, INDIANA, ASSIGNOR OF ONE-HALF TO
WILLIAM R. TEETERS, OF SAME PLACE.

AUTOMATIC BOILER-CLEANER.

SPECIFICATION forming part of Letters Patent No. 498,854, dated June 6, 1893.

Application filed January 9, 1893. Serial No. 457,848. (No model.)

To all whom it may concern:

Be it known that I, JOHN J. MINER, a citizen of the United States, residing at Fort Wayne, in the county of Allen, in the State of Indiana, have invented certain new and useful Improvements in Automatic Boiler-Cleaners; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawing, which forms part of this specification.

My invention relates to certain new and useful improvements in boiler cleaners which act automatically, and in which the foul water containing mud, magnesia, lime and other injurious substances, held mechanically or in solution, is caused to pass out from the boiler and into settling vessels where the heavier matters are deposited as sediment and the purified water is returned to the boiler.

Its objects are to provide, first, an improved skimmer, second, an improved suction to the outflow pipe, third, improved settling vessels, and fourth, improved means for cooling the settling vessels.

Other objects and advantages will hereinafter appear; and the invention consists in the construction and novel combination of parts hereinafter described, pointed out in the appended claims, and illustrated in the accompanying drawing in which:—

The drawing shows one figure, which represents a side view of the device and a boiler to which it is attached, with parts broken away to better show the construction.

Referring to the drawing by numerals, (3) designates a steam boiler of any known construction.

The skimmer consists of a main pipe (5) extending nearly the length of the boiler (3) and provided at intervals with inlet tubes (6) of much smaller diameter than the main pipe (5). These inlet tubes (6) enter the sides of the pipe (5) and are bent at right angles toward each end of the boiler from the center of said pipe (5) and are provided with cone shaped receivers (7) so that the flow or wave of the water, both forward and backward tends to enter some of the inlet tubes with the impetus of the flow or wave. The ends of

the main pipe are similarly provided with like small tubes or inlets (6) and receivers (7) opening in opposite directions. These inlet tubes (6) and receivers (7) form the only inlets to the main pipe (5).

The outflow pipe (8) is joined to and communicates with the main pipe (5) at or near its center, longitudinally, and is preferably provided with a valve (9) for regulation and control.

The settling vessels (10) and (11) are of similar construction and consist preferably of two parts (12) and (13) the smaller one placed above and in communication with the other. The outflow pipe (8) is connected to the top of the upper part (12) of the settling vessel (10) and communicates with it. The return pipe (14) is connected with the upper part (12) of the other settling vessel (11) and communicates with it. This return pipe (14) is also provided with a valve (15) for regulation and is connected to and communicates with the boiler (3) at a point always below the water line, preferably at the bottom as shown.

The vessels (10) and (11) communicate with each other through a connecting pipe (16) which is of larger diameter than the outflow pipe (8) but of smaller area in cross-section than the upper part or chamber (12).

The lower parts or chambers (13) are constructed in the same manner in both settling vessels (10) and (11), and are made larger than the upper chambers (12) for the purpose of further retarding the flow of the current. The upper parts (24) of these chambers (13) are made still larger for the same purpose, preferably with inclined sides toward their connection with the lower chamber (13) as shown in the drawings. On the upper parts (24) seats or flanges are provided to which the flanged ends of the connecting pipe (16) may be attached. Or any other suitable connection of the pipe (16) to the upper parts (24) may be made which will provide for a flow of water through said pipe. Both settling vessels are also provided with blow off cocks (17) for cleansing. The settling apparatus is suspended from the floor, preferably by a frame (18) so as to afford room for the blow off cocks (17).

I also provide cooling devices for both the

lower parts or chambers (13) and the connecting pipe (16) whereby they are subjected to the action of cold water. These devices consist in encircling these parts with water tight basins (19) and constructing a water tight trough (20) around the connecting pipe (16). These devices may if desired be provided with small discharge pipes to provide for a continuous flow of the water so that the inconvenience of any overflow will be avoided.

I also provide means to introduce a small jet of steam into the entrance end of the outflow pipe, whereby an outward suction is created in addition to the pressure of the steam upon the water. This consists in connecting one end of a small pipe or tube (21) to the bottom of the main pipe (5) at a point just below the center line of the outflow pipe (8) (extended,) where it connects with said pipe (5) and extending the other end of the tube (21) above the surface of the water, preferably near the top of the boiler where it is always in communication with the steam. The inlet tubes 6 and the pipe (5) are placed just below the surface of the water.

The operation is as follows: In the process of ebullition the mud and impurities in the water in the boiler are forced to the surface forming foul water and scum containing also any lime or magnesia with which the water may have been impregnated. The circulation commences with a slight pressure of steam, and the water flows into the receivers (7), whose wide open mouths are so placed that some of them always face the flow or waves of the water in the boiler and thus better collect the scum and floating substances from all parts of the surface, and which are drawn with the current through the inlet tubes (6) into the pipe (5) and then into the outflow pipe (8), the force of the flow being aided by a steam jet through the tube (21). The foul water then passes into the settling vessel (10), where, by reason of its greater area, the flow is retarded and the heavier sediment settles in the bottom of that vessel. The settling is also aided by the cooling basin (19). The circulation goes from there up into the connecting pipe (16) and over into the second settling basin (11) the cooling process being further aided by water in the trough (20) and reaching its lowest temperature in the lower chamber (13) of the second vessel (11) where all remaining sediment is deposited and the purified water passes back into the boiler through the return pipe (14). The sediment is blown off at the bottom of the vessels (10) and (11) as frequently as required to keep them from clogging. If only one settling vessel is used, the return pipe is connected to the top of the upper part (24) of the lower chamber (13), at the place or seat provided for the said connecting pipe and in similar manner.

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

1. In a boiler cleaner, a skimmer consisting

of the pipe (5) provided at intervals with inlet tubes of much smaller diameter and cone shaped receivers for said inlet tubes: the steam jet tube (21) connected as described to said pipe (5); an outflow pipe with one end connected to said pipe (5) at or near its center, longitudinally, and the other end connected to the top of a settling vessel: a settling vessel consisting of two parts or chambers of different areas in cross-section, the smaller placed above the larger and communicating with it, and the top or upper part of the lower chamber of still larger area in cross-section: a second settling vessel of similar construction: a connecting pipe attached to the said two settling vessels forming a communication between their lower chambers from the uppermost parts thereof: basins surrounding the said lower chambers adapted to hold water around their sides: and a trough for the connecting pipe adapted to keep it submerged in water.

2. In a boiler cleaner the combination of a skimmer consisting of a horizontal pipe extending nearly the entire length of the boiler and connected and communicating with an out-flow pipe at or near its center, with a series of inlet tubes provided with collectors or receivers whose open ends are of larger area; the inlet tubes forming the only inlets to said horizontal pipe and having their mouths facing in opposite directions on the opposite side of their connection respectively with the out-flow pipe; a settling vessel consisting of two parts or chambers of different area in cross-section, the smaller placed above the larger and communicating directly with it through its bottom; a second settling vessel of similar construction; a connecting pipe attached to said two settling vessels forming a connection between the upper parts of their chambers, and an out-flow pipe connecting the said skimmer to said settling vessels; and a return pipe to the boiler.

3. In a boiler cleaner in which the water circulates from the boiler into a settling vessel or vessels and thence back to the boiler: a settling vessel constructed in two parts or chambers of different areas in cross-section, the smaller without a bottom placed immediately over and forming a continuation of the larger: a return pipe attached to the top of the larger and lower chamber and communicating with the boiler at a point below the surface of the water.

4. In an automatic boiler cleaner provided with a settling vessel or vessels, basins surrounding the same adapted to keep such vessel or vessels submerged in water.

In testimony whereof I hereunto subscribe my name, in the presence of two witnesses, this 6th day of January, A. D. 1893.

JOHN J. MINER.

Witnesses:

H. C. HARTMAN,
H. W. J. ATKINS.