

E. BENJAMIN.
AUTOMATIC BOILER CLEANER.

Patented May 9, 1893.

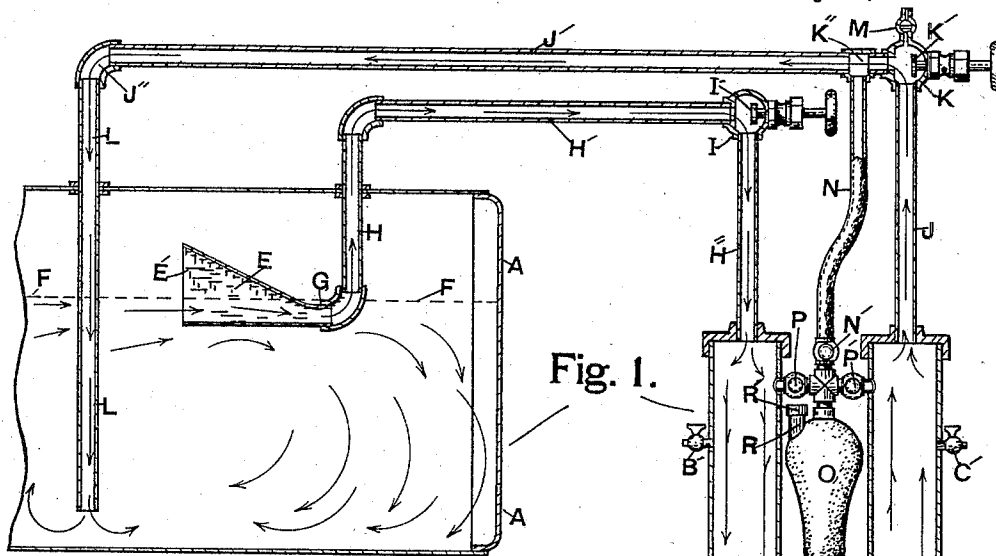


Fig. 1.

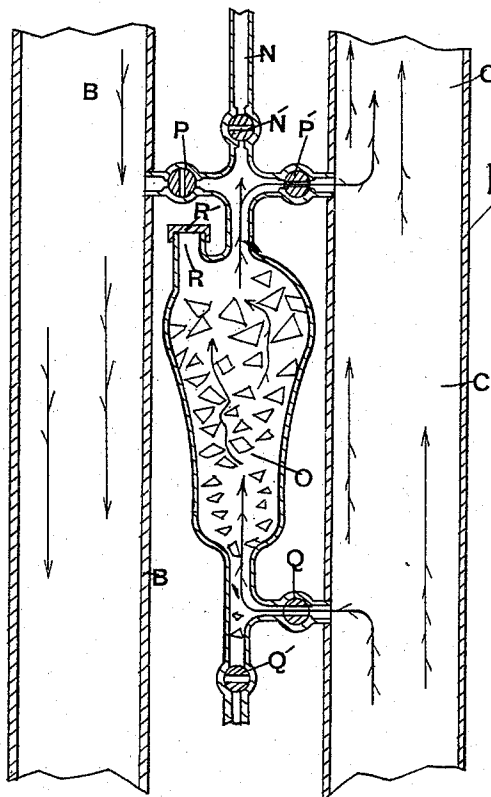


Fig. 2.

WITNESSES:

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INVENTOR:

Edwin Benjamin
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UNITED STATES PATENT OFFICE.

EDWIN BENJAMIN, OF CHICAGO, ILLINOIS, ASSIGNOR TO FRED S. BENJAMIN
AND HATTIE L. LITCHFIELD, OF SAME PLACE.

AUTOMATIC BOILER-CLEANER.

SPECIFICATION forming part of Letters Patent No. 497,046, dated May 9, 1893.

Application filed October 28, 1892. Serial No. 450,233. (No model.)

To all whom it may concern:

Be it known that I, EDWIN BENJAMIN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Automatic Boiler-Cleaner, of which the following is a specification.

My invention relates to means for the prevention of the deposit of sediment in steam boilers and the objects of my invention are to provide an efficient means for conducting the water from a boiler to a chamber which permits the sediment in the water to settle in a position away from the intense heat of the furnace and where the sediment can be easily and quickly removed from time to time without disturbing the boiler; and another object is: to provide means intimately connected to the precipitator by which chemicals or oils can be introduced into the boiler while under steam, all of which apparatus is illustrated by the accompanying drawings, in which—

Figure 1 is a vertical section of the rear end of a steam boiler and also vertical sections of the pipes which connect the boiler with my new form of precipitator which is also shown in vertical section—there being a means for introducing chemicals into the boiler shown in elevation in operative position attached to the side pipes of the precipitator. Fig. 2 is a vertical section of a portion of the side pipes of the precipitator on a larger scale than is shown in Fig. 1, and in Fig. 2 is shown in vertical section a slightly modified form of the chamber for introducing chemicals into the boiler from the form shown in Fig. 1, the connections being of the simplest kind to better show manner of operation.

Similar letters indicate like parts throughout the several views.

A is the boiler and B and C the two vertical side pipes of the precipitator, the lower ends of these pipes being securely attached to and are in communication with the precipitating chamber D. Within the boiler is seen, in vertical section, a skimmer E, which is of the ordinary form for such purpose, having the sides top and bottom made of some thin sheet metal of a flaring form, the large end E' being turned toward the front end of the boiler, in this instance, to receive the

scum at the surface F of the water. The small end G, of the skimmer, is secured to and communicates with pipe H, which pipe passes up through the top of the boiler and communicates with pipe H' through the elbow shown. Pipe H' is connected to side pipe B, of the precipitator, by means of valve globe I and pipe H''. Side pipe C has communication with the boiler through pipe J valve globe K, T connection and nipple K'' pipe J' elbow J'' and pipe L. Pipes H and L have screw flanges for insuring a steam tight joint where they pass through the boiler shell. Valve K' in globe K serves to close the passageway between pipes J and J'. Pipe L passes down through the top of the boiler and extends almost to the bottom thereof as shown.

It is well known that water in the ordinary type of tubular boiler rises at the front end of the boiler where the heat is greatest and the water flows backwardly as a surface current, which current is deflected downwardly, and thence to the front of the boiler by contacting with the rear boiler head, this current's direction being shown by the arrows. When valves I' and K' are open water can flow into the open end E' of skimmer E thence in direction of arrows through pipes H and H' thence through valve globe I, thence downward through pipe H'' into precipitator side pipe B, thence down into the chamber D, then horizontally to the lower end of side pipe C, thence upwardly to and through pipe J and through valve globe K, thence through pipe J' and the elbow J'', thence downward through pipe L into the boiler.

It will be noticed that a small valve is shown at M in vertical section, which valve permits the contents of globe K to escape into the atmosphere, when the valve is open.

At N is shown a pipe which forms a means of communication between pipe J' and chamber O through valve N'.

At P and P' are valves which guard passageways from chamber O, right and left, into side pipes B and C, and at Q is a valve which guards a passageway from the lower end of chamber O, into side pipe C.

Q' is a blow off valve to empty chamber O. At R is a neck within which is an orifice which is closed by means of a cap R'. Through

neck R chemicals can be introduced into the interior of chamber O for the purpose of being fed into the boiler to soften the water and cause the precipitation of the sediment in a loose form in settling chamber D.

S is a blow off valve at the bottom of chamber D, and T and T' are plugs which close holes through which the sediment in chamber D can be removed.

B' and C' are pet cocks which are opened to test the height and condition of the water in side pipes B and C.

Various chemicals are used for neutralizing the mineral elements in hard water and cause their deposition in a comparatively loose state without forming a hard scale and for the special purpose of introducing such chemicals into boilers I have combined the chamber O so intimately with my precipitating apparatus that it forms a part thereof in serving as an auxiliary to insure the deposit of all sediment away from the boiler and from contact with surfaces which are highly heated.

In some instances materials are introduced in the form of crystals into chamber O, which are slowly dissolved by a current of water passing into the chamber at valve Q, thence upward, as shown by the arrows, and out again into pipe C through valve P'. In the case of materials that have a specific gravity lighter than water in chamber O, they always pass out through valve P' into pipe C and thence to the boiler. Materials for purifying purposes heavier than water would pass out of chamber O in a direction through valve Q, the reverse of that shown by the arrows.

If desired, valve K' can be closed and valves Q and N' left open with P and P' closed, when any material lighter than water introduced into chamber O can be slowly fed upward through pipe N, by partially opening these valves, or fed rapidly by giving the valves a full opening the circulation of the water being downward in pipe B and upward in pipe C to the passage leading through valve Q, thence up through chamber O, thence through valve N' pipe N, pipes J' and L to the boiler.

By closing valves Q and N' and opening

valves P and P' with chamber O filled with a material lighter than water the material will rise and pass out into pipe C, and water from pipe B passes into the chamber through valve P.

In starting a circulation of water through this apparatus all of the valves guarding passages to chamber O are usually closed when if valve K' is closed with valve I open and small valve M at the top of globe K opened with boiler A under steam the pressure in boiler A will force the water into skimmer E and through pipes H, H' and H'', side pipe B chamber D, side pipe C and pipe J into the atmosphere through valve M after which if valve K' is opened and valve M closed the circulating water will pass back into the boiler through pipes J and L as before described.

I claim as my invention—

1. A steam boiler cleaner comprising two vertical side pipes B and C, as described, the top of one of said side pipes in communication with the water near the bottom of a steam boiler, and the top of the other of said pipes in communication with the water near the surface thereof within said steam boiler, each of said pipes having its lower end mounted upon the top of and in communication with a precipitating chamber which forms a horizontal connection between said pipes substantially as described.

2. In a steam boiler cleaner having vertical side pipes B and C in combination with a precipitating chamber D, a chamber O having means of communication with said side pipes said means of communication provided with valves capable in the open position of permitting a circulation of water from said side pipes through said chamber O for the purpose described.

In testimony that I claim the foregoing I have hereunto set my hand, this 14th day of October, 1892, in the presence of witnesses.

EDWIN BENJAMIN.

Witnesses:

HARRY BROWN,
OSCAR SNELL.