

UNITED STATES PATENT OFFICE.

FRANK H. NEWHALL, OF JUNEAU, DISTRICT OF ALASKA.

BOILER CIRCULATING DEVICE.

945,977.

Specification of Letters Patent.

Patented Jan. 11, 1910.

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To all whom it may concern:

Be it known that I, FRANK H. NEWHALL, a citizen of the United States, residing at Juneau, in the District of Alaska, have invented certain new and useful Improvements in Boiler Circulating Devices; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to automatic circulators for internally fired boilers such as the Scotch-marine and Clyde-marine types.

The object of the invention is to provide a positive constant circulation of water in the boiler at all times and thereby more evenly distribute the heat contained in the boiler, to equalize more equally the expansion and contraction of the component parts of the boiler, to increase the efficiency and the steaming capacity and to thereby prolong the life incident to unequal expansion and contraction of the different parts.

With these and other objects in view, the invention consists of certain novel features of construction, combination and arrangement of parts, as will be more fully described and particularly pointed out in the appended claim.

In the accompanying drawings, Figure 1 is a vertical longitudinal section of an internally-fired boiler with parts broken away. Fig. 2 is a front elevation with parts broken away.

Referring more especially to the drawings 1 represents a casing and 2 the fire box therein with the crown sheet 3 arranged thereabove. Suitably supported as is usual upon the bridge wall and on the front of the furnace are the grate bars 4. Upon each side of the boiler adjacent the lower portion of the casing I tap the casing and secure therein suitable valves 5 and 6 which are connected to horizontally arranged piping 7 which extends to the front of the boiler where it is connected by elbows 8 to vertical pipes 9. These pipes 9 extend along the front of the furnace to a point immediately below the grate bars where they are connected by elbows 10 to the horizontal pipes 11 the latter extending into the casing and under the grate bars in parallel relation, through the bridge wall 12. At this point they are connected to one end of substantially S-shaped pipes 13 by right and left hand coupling members 14. At their other ends these pipes

13 are passed through an aperture in the casing and are connected by suitable elbows 15, as shown, these elbows have connected with them another section of pipe 16 which is in turn connected to elbows 17 and these in turn are connected to the upper horizontal pipes 18.

The S-shaped pipes 13 where they pass through the casing in the rear of the boiler are packed with a suitable packing 19, which is connected to a short section of boiler tubing headed up into the casing and passing through the aperture therein. The forward ends of the pipes 18 are connected to suitable inlet valves 20 which enter the casing at a point a little below the lowest water level of the boiler to prevent the steam from driving back the water in pipes 18 and thereby interfering with the circulation.

By operating the valves in the proper manner it will readily be seen that the circulation through the pipes mentioned may be properly regulated. For instance the exit valves at the lower portion of the boiler may be fully opened and the inlet valves at the upper portion of the boiler may be partially closed off so that the water is greatly heated before being again returned to the boiler. Rapid circulation may be attained by adjusting the valves in just the opposite manner *i. e.*, the exit valves being slightly opened and the inlet valves at the upper end of the boiler being fully opened. The water after passing into the boiler from the inlet valves at the top flows downwardly and eventually enters the exit valves to be started in circulation again.

From the foregoing description, taken in connection with the accompanying drawings, the construction and operation of the invention will be readily understood without requiring a more extended explanation.

Various changes in the form, proportion and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of this invention as set forth in the appended claim.

What I claim as my invention is:

The combination with an internally fired boiler having a fire box with grate bars therein and a flame chamber at the rear thereof, said boiler having openings arranged on each side thereof in the lower portion of its casing, of exit valves secured in

said openings, horizontally arranged pipes connected at one end to said valves and extending to the front of the boiler and terminating at their upper ends at a point below
5 the grate bars, elbows connecting the lower ends of said vertical pipes with the free ends of said horizontal pipes, parallel horizontal pipes arranged in the boiler casing below said grate bars and connected at their
10 front ends with said vertical pipes, substantially S-shaped pipes extending longitudinally through said flame chamber and connected at one end with the rear ends of said last mentioned horizontal pipes before
15 entering said chamber, the other ends of said S-shaped pipes being extended through

said boiler casing at opposite sides of the upper rear portion thereof, upper horizontal pipes, and couplings connecting one end of said upper horizontal pipes to the free
20 ends of said S-shaped pipes, the other ends of said upper horizontal pipes entering the opposite sides of the boiler casing at points below the lowest water level of the boiler, said pipes being provided with inlet valves. 25

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

FRANK H. NEWHALL.

Witnesses:

GEORGE H. WHITNEY,
LAWRENCE F. CONVERSE.