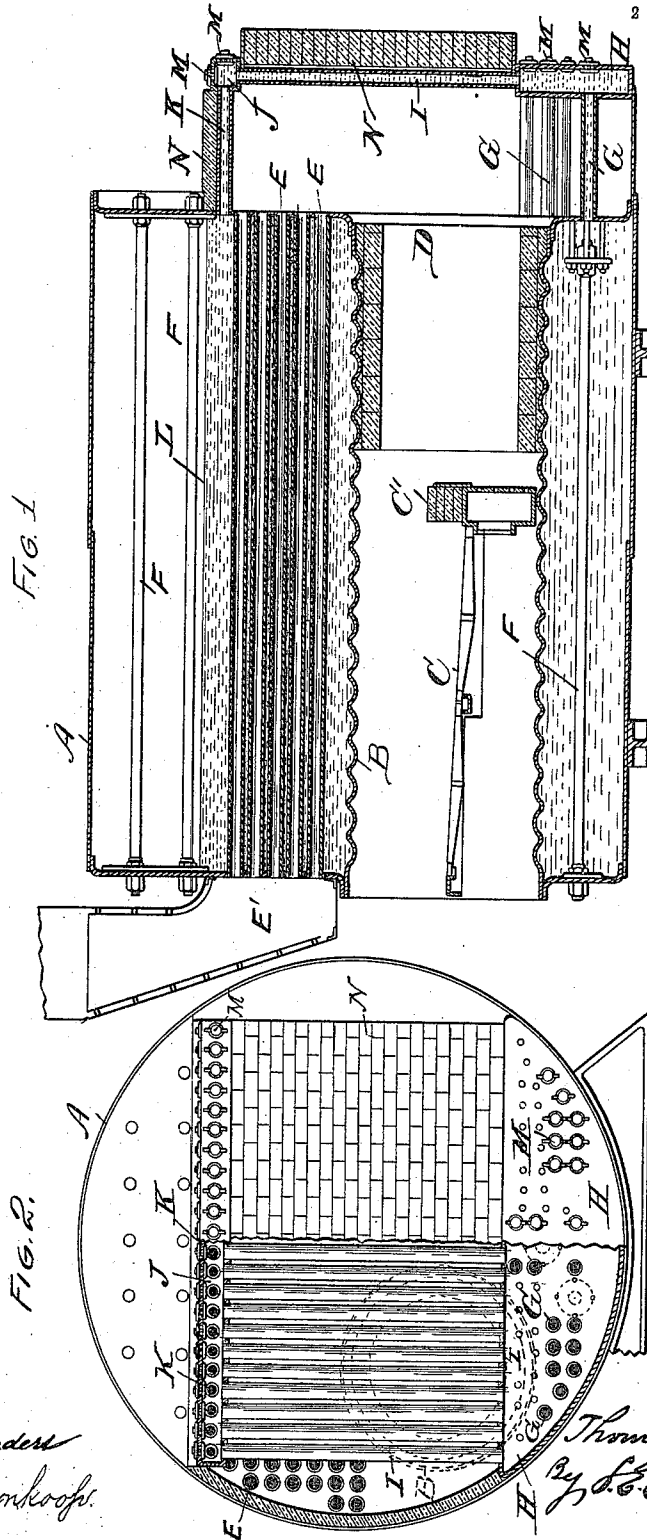


T. BARROW.
CIRCULATING ATTACHMENT FOR BOILERS.
APPLICATION FILED MAR. 1, 1909.

974,736.

Patented Nov. 1, 1910.

2 SHEETS—SHEET 1.



Witnesses
L. E. Flannery
Grace E. Wynkoop.

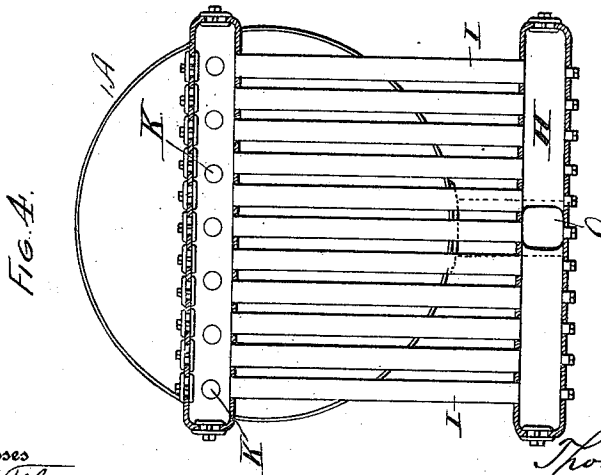
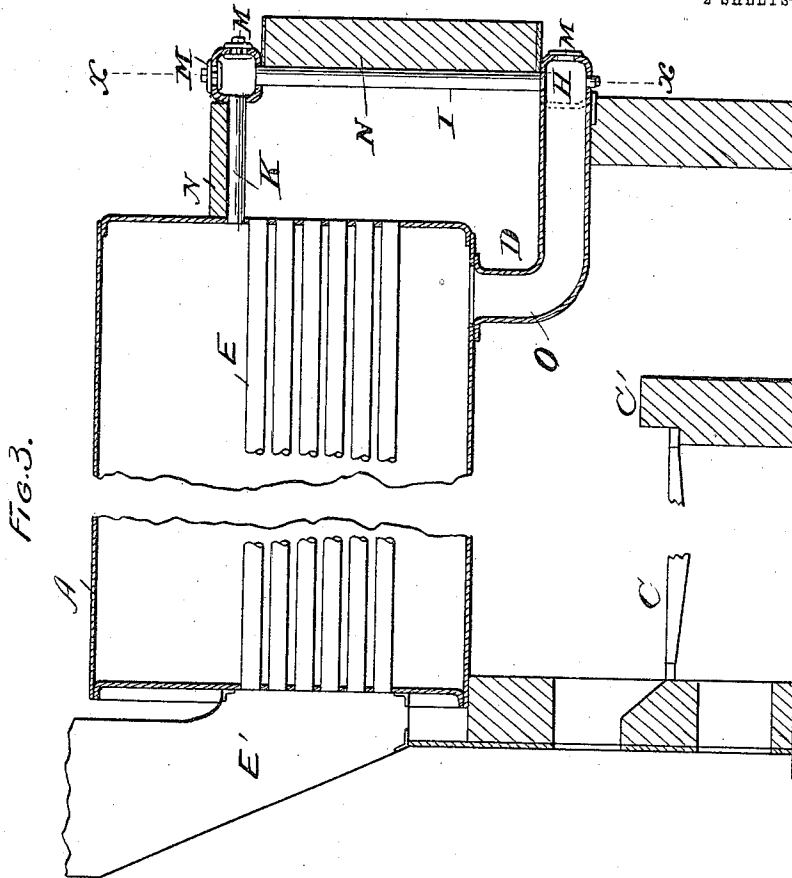
Inventor
Thomas Barrow
By L. E. Thomas
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2 SHEETS—SHEET 2.



Witnesses
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UNITED STATES PATENT OFFICE.

THOMAS BARROW, OF DETROIT, MICHIGAN.

CIRCULATING ATTACHMENT FOR BOILERS.

974,736.

Specification of Letters Patent.

Patented Nov. 1, 1910.

Application filed March 1, 1909. Serial No. 480,555.

To all whom it may concern:

Be it known that I, THOMAS BARROW, a subject of Great Britain, residing at Detroit, county of Wayne, State of Michigan, have
5 invented a certain new and useful Improvement in Circulating Attachments for Boilers, and declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art
10 to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to an attachment to
15 steam boilers for increasing or assisting the rapid circulation of water therein thereby providing quicker steaming qualities;—being adapted for employment in connection with marine, internally fired, stationary,
20 horizontal tubular, and other types of boilers.

The object of this invention is to draw the water from the bottom of the boiler, delivering it into the boiler again at a point
25 just below the water line therein, thereby inducing the rapid circulation of water and thus securing quick steaming qualities.

In the drawings forming part of this specification: Figure 1 is a longitudinal central vertical sectional view of an internally
30 fired boiler with the attachment in position. Fig. 2 is an end elevation of the boiler with parts broken away and in section showing the vertically disposed water circulating
35 pipes connecting the upper and lower headers of the attachment. Fig. 3 is a central longitudinal sectional view of an externally fired boiler with my attachment in position. Fig. 4 is a cross-sectional view on line X—X
40 of Fig. 3.

Referring now to the letters of reference spread upon the drawings:—A indicates the shell of a boiler. B an internal corrugated furnace flue; C the grate; C' the bridge
45 wall; D the combustion chamber which is partly external to the shell; E are fire tubes; and E' is the smoke box and uptake.

F are the usual stay bolts.

G denotes a series of water tubes leading
50 from the lower portion of the boiler rearwardly, their outwardly projecting ends supported in a suitable header or manifold H. Rising from the header H is a plurality of vertical water tubes I, which in turn communicate with an upper header or manifold
55 J.

K are a series of tubes leading from the header J back to the boiler and below the water line L.

M are hand holes in the headers H and J
60 through which the water tubes G, I, and K may be cleaned.

N is a fire brick wall, suitably supported, inclosing the water tubes I and K, forming
65 that portion of the combustion chamber external to the shell.

In the externally fired boiler shown in Figs. 3 and 4, O is a pipe of suitable capacity leading from the bottom of the boiler at the rear to the middle of the lower header
70 or manifold H. From the header H rise the tubes I, connecting the header J, which is in turn connected with the boiler by the tubes K, as shown in Figs. 1 and 2.

It will be understood that the modifica-
75 tion just described may be employed on an internally fired boiler if desired, or vice versa, as required.

Having indicated the several parts by reference characters, the operation of my invention will be readily understood.

As soon as the water in the boiler is sufficiently heated it will begin to circulate, passing out through the pipes G into the header H, thence up through the pipes I
85 into the header J, and from there back to the boiler through the pipes K,—resulting in a more rapid movement of the water, thereby providing a boiler with quicker steaming qualities. If desired the tubes G
90 may project through the shell of the boiler and extend into the latter any suitable distance. These projecting tubes may be of different lengths in order to receive water at different points along the bottom of the
95 boiler, the object being in any case to insure a more uniform temperature throughout. I find, however, that the construction shown in the drawings produces very satisfactory
100 results.

This attachment may be put at the back of boilers with one, two, three, or more furnaces, for either stationary or marine purposes and at the back of horizontal, tubular
105 or other types.

Having thus described my invention, what I claim is:—

1. In a boiler, an upper and a lower header spaced from the rear end of the boiler, vertical water tubes bridging the
110 opening between the upper and lower headers, a brick wall closing said opening and

spaced from said tubes, a plurality of horizontally arranged water tubes leading from the boiler to the lower header, a plurality of horizontally arranged water tubes leading
5 from the upper header to the boiler below its water level, and a wall above said tubes bridging the space between the end of the boiler and the upper header supported by said upper row of water tubes.

10 2. In a boiler, an upper and a lower header in the same vertical plane, spaced from and parallel with the rear end of the boiler, water tubes bridging the opening between the upper and lower headers, a
15 brick wall closing said opening and spaced from said tubes, means for supporting said

wall carried by the headers, a plurality of horizontally arranged water tubes leading from the boiler to the lower header, a plurality of horizontally arranged water tubes
20 leading from the upper header to the boiler below its water level, and a wall above said tubes bridging the space between the end of the boiler and the upper header supported by said upper row of water tubes.

25 In testimony whereof, I sign this specification in the presence of two witnesses.

THOMAS BARROW.

Witnesses:

SAMUEL E. THOMAS,
GRACE E. WYNKOOP.