

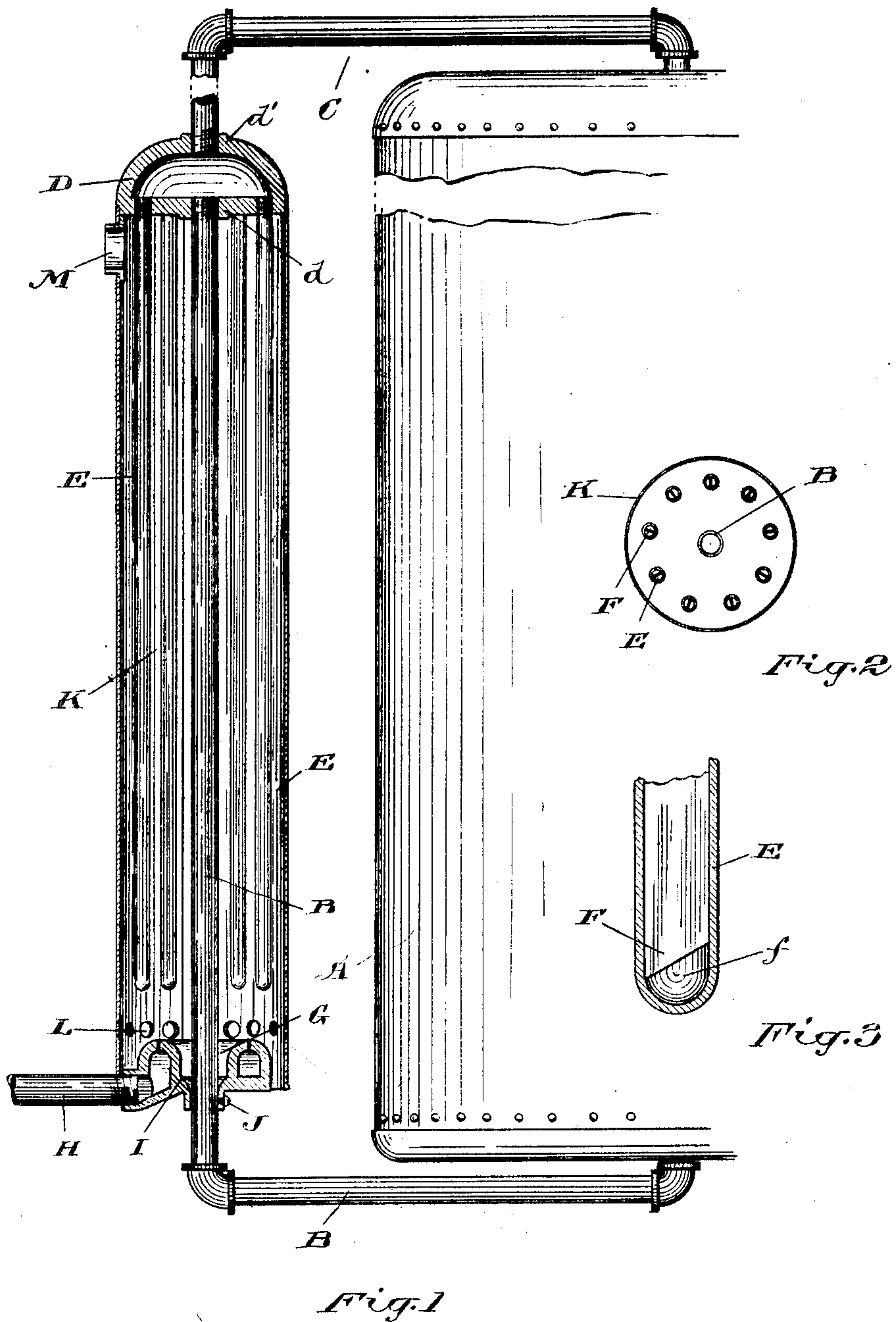
No. 679,552.

Patented July 30, 1901.

J. J. CUNNINGHAM.  
WATER HEATER FOR RANGE BOILERS.

(Application filed Mar. 2, 1900.)

(No Model.)



Witnesses

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# UNITED STATES PATENT OFFICE.

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## WATER-HEATER FOR RANGE-BOILERS.

SPECIFICATION forming part of Letters Patent No. 679,552, dated July 30, 1901.

Application filed March 2, 1900. Serial No. 7,140. (No model)

*To all whom it may concern:*

Be it known that I, JOHN JOSEPH CUNNINGHAM, a subject of the Queen of Great Britain, residing at 245 Macdonell avenue, in the city of Toronto, in the county of York and Province of Ontario, Canada, have invented certain new and useful Improvements in Water-Heaters for Range-Boilers; and I hereby declare that the following is a full, clear, and exact description of the same.

This invention relates to certain new and useful improvements in water-heaters for range-boilers, and relates more particularly to a water-heater which can be easily attached to any range-boiler without the alteration of any of the parts or fixtures; and the object of the invention is to so arrange the heater that it will quickly heat the water and cause its rapid circulation to the range-boiler; and the invention consists, essentially, of a water-head to which are connected the flow and return pipes in circulation with the range-boiler and a series of depending or downwardly-directed water standards or tubes in circulation with the water-head, each standard or tube being provided with a central partition dividing it into two water-legs, which water-legs are in circulation with each other at the bottom of the water standard or tube and at the water-head, a burner located below the lower ends of the water standards or tubes, and a casing inclosing the water-standards and burner and lower part of the water-head, as hereinafter more fully set forth, and more particularly pointed out in the claims.

In the drawings, Figure 1 is a vertical section of the heater, showing it attached to a range-boiler. Fig. 2 is a plan view of the under side of the water-head. Fig. 3 is a vertical section of the lower end of the water standard or tube.

Like letters of reference refer to like parts throughout the specification and drawings.

A represents the range-boiler, to the lower end of which is fitted the return-pipe B, and to the upper end of which is fitted the flow-pipe C. Fitted to the top of the return-pipe B is the bottom *d* of the water-head D, and fitted to the flow-pipe C is the top *d'* of the water-head D. Depending from the bottom

*d* of the water-head D are a series of water standards or tubes E, the upper ends of which are in connection with the water-head D and the lower ends of which are hermetically closed. In each of the water standards or tubes E is a central partition F, which extends downwardly from the top of the tube to approximately the bottom. Between the bottom of the partition and the bottom of the water standard or tube is a port *f* to permit the circulation between the two water-legs into which the tube is divided by the partition F. Located below the bottom of the water standards or tubes E is a burner G, fitted with a pipe H, in communication with the heating agent. The burner G is provided with a hub I, having a central bore, through which passes the return-pipe B, and passing through the hub I is a set-screw J, by means of which the burner G is connected to the return-pipe B. Inclosing the burner G, water standards or tubes E, and lower part of the water-head D is a casing K to retain the heat around the water standards or tubes in order that its heating properties can be absorbed and utilized for the purpose of heating the water in the standards or tubes. The lower part of the casing K is provided with a series of openings L, preferably in alinement with the top of the burner G, to provide a supply of atmospheric air for the maintenance of the combustion. The top of the casing K is provided with an outlet M, to which can be fitted a pipe leading to the chimney or other escape-duct.

The length, diameter, and number of water standards or tubes and the dimensions and shape of the water-head and burner can be varied without departing from the nature of the invention.

The operation of the invention is as follows: The heating agent is ignited at the burner G, the combustion being maintained by the air admitted through the openings L. The heated gases and products of combustion ascend within the casing K and coming in contact with the water standards or tubes E are absorbed by the same and the water within them. The water as it becomes heated circulates from the range-boiler through the return-pipe B to the water-head D and descends



through one leg of each of the water standards or tubes and ascends through the other to the water-head, from which it is returned to the boiler by the flow-pipe C. The water  
5 as it passes through the return-pipe to the water-head is partially heated by the gases and products of combustion within the casing, so that when it reaches the water-head the chill is taken off of it.

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

1. A water-heater for range-boilers, embracing in its construction a water-head,  
15 flow and return pipes connected to the water-head, a series of water-tubes depending from the water-head surrounding the return-pipe, the lower ends of the water-tubes being hermetically closed, and the upper ends  
20 in circulation with the water-head, a vertical partition centrally located in each water-tube forming two legs which are in circulation with each other at the lower end of the tube and with the water-head at the upper  
25 end, a heater opposed to the lower ends of the water-tubes and a perforated casing inclosing the water-head, the water-tubes, and

that portion of the return-pipe between the water head and heater, substantially as specified.

2. A water-heater for range-boilers embracing in its construction a water-head, flow and return pipes connected to the water-head, a series of water-tubes depending from the water-head surrounding the return-pipe,  
35 the lower ends of the water-tubes being hermetically closed and the upper ends in circulation with the water-head, a vertical partition centrally located in each water-tube forming two legs in the same, in circulation  
40 with each other at the lower end of the tube and with the water-head at the upper end, a heater opposed to the lower ends of the water-tubes encircling the return-pipe, a perforated casing inclosing the water-head, the  
45 water-tubes and that portion of the return-pipe between the water head and heater, and an outlet for the casing contiguous to the water-head, substantially as specified.

Toronto, February 19, 1900.

J. J. CUNNINGHAM.

In presence of—

C. H. RICHES,  
G. SNYDER.