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PATENTED MAY 10, 1904.

J. G. HALLAS & W. McLAUGHLIN.

WATER HEATER.

APPLICATION FILED MAY 7, 1903.

NO MODEL.

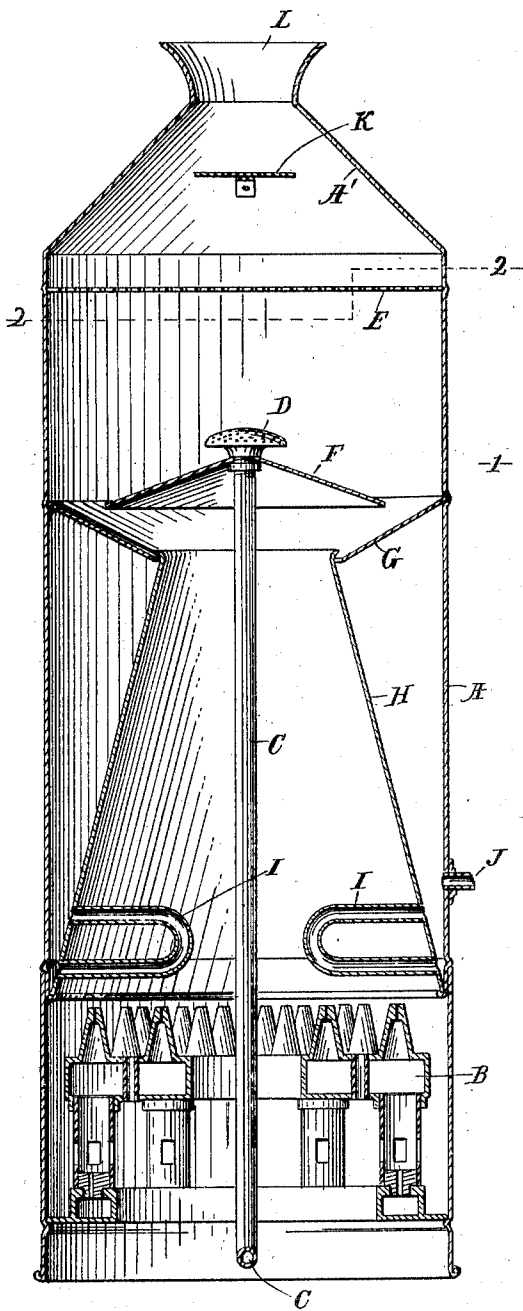


*Fig. 1.*

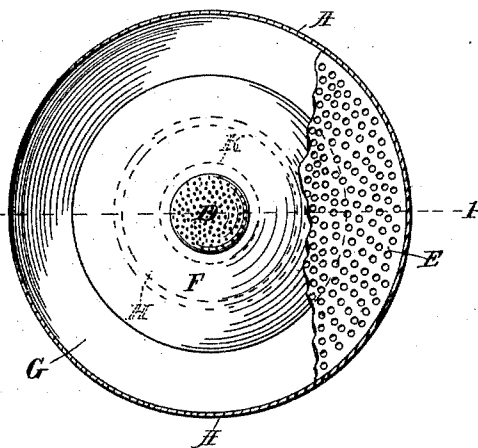


*Fig. 2.*

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# UNITED STATES PATENT OFFICE.

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## WATER-HEATER.

**SPECIFICATION** forming part of Letters Patent No. 759,607, dated May 10, 1904.

Application filed May 7, 1903. Serial No. 156,120. (No model.)

*To all whom it may concern:*

Be it known that we, JAMES G. HALLAS and WILLIAM McLAUGHLIN, citizens of the United States, residing at Grand Rapids, in the county of Kent and State of Michigan, have invented certain new and useful Improvements in Water-Heaters; and we do hereby 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.

Our invention relates to improvements in instantaneous water-heaters, and more particularly to such heaters adapted for use in heating water for baths and analogous purposes; and its primary object is to provide a device having a more effective and rapid operation, to provide for better air circulation through the device, whereby complete combustion is secured and no chimney connection needed, to provide means for preventing water from dropping on the burner from the water-tubes, and to provide the device with certain new and useful features hereinafter more fully described, and particularly pointed out in the claims, reference being had to the accompanying drawings, in which—

Figure 1 is a vertical section of a device embodying our invention, taken on the line 1 1 of Fig. 2; and Fig. 2, a transverse section of the same, taken on the line 2 2 of Fig. 1.

Like letters refer to like parts in both figures.

A represents a suitable cylindrical case, arranged with its axis vertical and having a contracted upper part A' and an opening L at the top to permit the escape of the air-current from the burner. In the lower part of this case is any convenient heating device B, preferably a gas-burner having a central opening, and in the axis of this case and burner is arranged a stand-pipe C to supply the incoming water and provided with the usual stop-cock (not shown) to regulate the flow of water. This stand-pipe extends to near the top of the case A and terminates in a sprinkler-head D, adapted to project the water upward in a spray

and to distribute the same within the upper part of the case A.

E is a diaphragm located a suitable distance above the sprinkler D and consisting of any perforated plate or screen, as at E, and arranged horizontally across the upper part of the case A. Above the diaphragm and below the opening L is a baffle-plate K to prevent any water escaping through the opening L.

Below the sprinkler D and supported on the stand-pipe C is a hood F, having an outwardly and downwardly inclined surface extending above and beyond the periphery of the open end of the flue H. Said flue is in the form of a truncated cone, the base of which is secured to the case A. The upper portion of this flue extends to a distance below the hood F sufficient to permit the current of air to escape from the flue. Surrounding the upper part of this flue and with its inner edge a short distance therefrom is an inverted truncated and conical collector G, having a narrow space between its inner edge and the exterior of the flue H to allow the water to escape.

Near the bottom of the flue H are inserted inwardly-projecting U-shaped water-tubes I, with their open ends extending through the wall of the flue and opening into the space between the flue H and the case A.

J represents a pipe or faucet for drawing off the hot water and located above the level of the water-tubes I.

The operation of the device is as follows: The hot air and products of combustion from the burner E pass upward through the flue H, and thence impinge upon the hood F and escape between the same and the surface of G, and then pass upward and through the screen E and around the baffle K and out at the opening L, heating all of these various parts together with the tubes I and the upper part of the case. The water enters at the stand-pipe C and escapes in an upwardly-projected spray at D, and impinging upon the screen E is partially arrested thereby, portions of the water passing through the openings in the screen and impinging upon the baffle K and contracted

part A' of the case. The spray being projected through the screen E with considerable force prevents formation of films of water over the openings in said screen, which films would obstruct the upward current of hot air, and thus prevent proper operation of the device. After the upward movement of the water is completed it falls upon the hood F and the collector G and is discharged upon the outer surface of the flue H, down which it flows, and finally accumulates in the lower part of the space between the said flue and the case A. The water is thus first projected upward in a spray in the same direction as the air-current, and thus aids in the draft of the device, whereby sufficient air is supplied to the burner to avoid odors from the same due to incomplete combustion and enables us to use the device without connecting the same to a chimney.

The water also passes twice through the ascending hot-air current and also impinges on the hot screen E and baffle K. A large portion of the water also falls upon the hood F and drops off the periphery thereof through the ascending hot-air current. The water thus becomes rapidly heated and accumulating in the bottom of the space between the flue and the case fills the tubes I, wherein it is still further heated.

By the construction shown we provide for a preliminary heating of the water before it enters the tubes I, and thus by filling the tubes with warm water they will not accumulate moisture on their outer surfaces or "sweat" and drop water upon the burner below, as would be the case if filled with cold water in the first instance.

Having thus fully described our invention, what we claim, and desire to secure by Letters Patent, is—

1. In a water-heater, a case, a burner in the lower part of the case, a stand-pipe in the case, a sprinkler on the stand-pipe and arranged to project water against the diaphragm, a foraminous diaphragm above the sprinkler and extending continuously across the case, means above the diaphragm for returning water through the diaphragm, and means for collecting the water in the lower part of the case.

2. In a water-heater, the combination of a case having a conical top having a central opening, a baffle opposite the said opening, a foraminous diaphragm extending continuously across the case and below the baffle, a stand-pipe in the case, a sprinkler on the stand-pipe and arranged to project water upward through the diaphragm and against the baffle and conical top, means for collecting the water in the lower part of the case and a burner in the case.

3. In a water-heater, the combination of a case having a truncated conical top having a central opening, a baffle below the opening, a foraminous diaphragm extending continuously and horizontally across the case and below the top and baffle, a stand-pipe in the axis of the case, a sprinkler on the stand-pipe, and adapted to project water upward through the diaphragm and against the baffle and top, a truncated conical flue in the case and attached thereto, a burner below the flue, a hood above the flue, and below the sprinkler, and a collector surrounding the flue, and attached to the case.

In testimony whereof we affix our signatures in presence of two witnesses.

JAMES G. HALLAS.

WILLIAM McLAUGHLIN.

Witnesses:

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