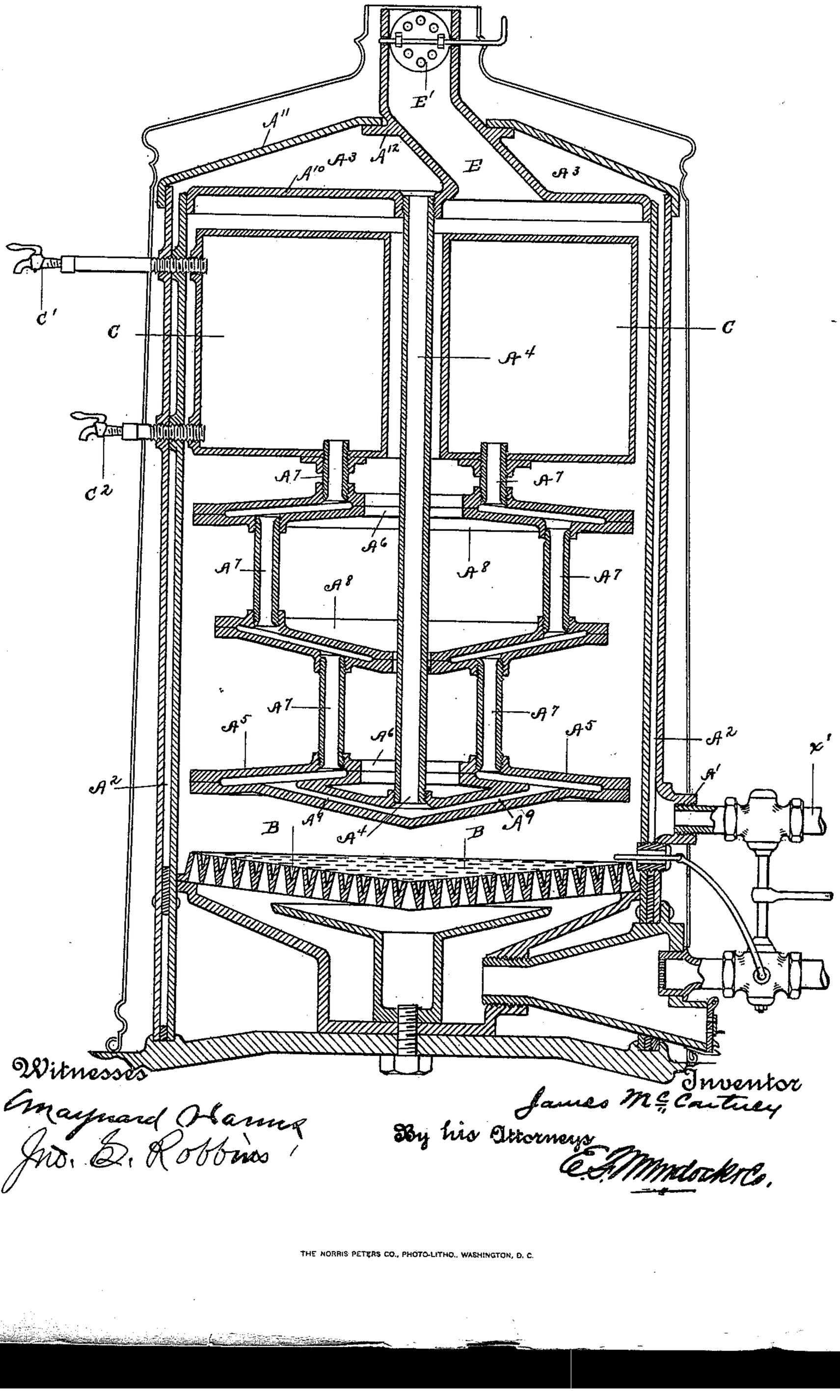
No. 624,070. Patented May 2, 1899.

J. McCARTNEY.

WATER HEATER.

(Application filed Jan. 6, 1898.)

(No Model.)



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JAMES McCARTNEY, OF OAKLAND, CALIFORNIA.

WATER-HEATER.

SPECIFICATION forming part of Letters Patent No. 624,070, dated May 2, 1899.

Application filed January 6, 1898. Serial No. 665,817. (No model.)

To all whom it may concern:

Be it known that I, JAMES MCCARTNEY, a citizen of the United States, residing at Oakland, in the county of Alameda and State of California, have invented certain new and useful Improvements in Water-Heaters; and I do hereby declare the following to be a full, clear, and exact description of said invention, such as will enable others skilled in the art to which it most nearly appertains to make, use, and practice the same.

This invention relates to improvements in water-heaters, and more particularly to that class of water-heaters known as "instantaneous" water-heaters.

Heretofore there have been several styles of water-heaters devised for the purpose of heating water rapidly. The mechanical constructions have been designed principally to spread the volume of water in very thin layers to bring as far as possible all of the water under the influence of the heating medium, and thereby raise the temperature of the water rapidly. The difficulty under which this form of heater has labored has existed in the fact that the quantity of water so heated has been and is of necessity small; also, unless carefully regulated the temperature of the water heated is very near the boiling-point. While this purpose has heretofore been obtained by mixing the hot water obtained from the heater with cold water obtained from other sources, it has not proved altogether desirable under all conditions. A large field for the demand of this class of heaters is in barber-shops, where "tepid water" is desired. It is to overcome the objection above mentioned that is one of the objects of the present invention.

To this object and also to improve generally upon devices of the nature indicated my invention consists in the various matters hereinafter described and claimed.

The drawing represents a vertical sectional view of the invention, showing the circulation system, together with the heating appliances and the reservoir.

For convenience of description with reference to the drawing we will let the letter A designate what has hereinbefore been spoken of as the "circulation system." The various details of the system will be indicated by the common letter A, having added thereto a distinguishing-numeral. To the heating appliance we will designate the letter B, and as any desired heater can be employed further description of the heating member is believed to be unnecessary. To the reservoir we will assign the letter C and similarly indicate the various details of its construction by the addition of a distinguishing-numeral to the common letter. The outer casing or hood within which the heating appliance is contained we will designate by the letter D.

These heaters are usually attached to a water-supply pipe X′, having a certain ascertained pressure upon it. To make the connection, I have provided the heater with a boss A′, which opens into a space A^2 between the outer and inner walls of the cylinder of the heating-chamber. This space A^2 is continuous, and in construction the sides are drawn close together to spread the water entering through the pipe X′ and the boss A′ over as much surface as possible. At the upper end the space A^2 opens into a spreading-chamber A^3, extending across and forming the top of the cylinder of the heater. This spreader forms a disk-shaped surface. The water contained in the said chamber flows down the pipe A^4, the purpose of which is to convey the water from the spreading-chamber A^3 to the initial heating-disk A^5.

In delivering the water into the disk A^5 the pipe A^4 is introduced from above into the lowest point or outer edge of the said disk, which is purposely given a conical shape to operate as a hood. The chamber A^5 is constructed in two parts or walls of thin metal and having an interior separation of small dimension between the proximate surfaces of the metal sides. The object in this construction is as in the construction of the water-space A^2 in the cylinder—to wit, to spread the volume of water in a thin layer over as much surface exposed to the influence of the heating appliance as possible.

The chamber A^5 is given a downward inclination with the purpose of confining the heat-rays to compel them to pass upward over the whole surface to the exit A^6. At the highest point of the chamber are introduced one or more connecting-pipes A^7, which communicate with the spreading-chamber

immediately above. The second chamber is connected similarly to the third, counting upward, and so on, providing as many of the spreading-chambers as is deemed necessary and desired. In each case the intermediate spreading-chambers are similarly constructed in that they are oppositely arranged as far as their apex is concerned, this being extended upward or downward with reference to the adjacent chambers. The chambers where the apex is extended upward are constructed of greater diameter and approach closely the side walls of the cylinder to compel the heat-rays as they pass upward to sweep the under surface in moving from the enlarged central openings A^6 through which they are delivered onto the downwardly-extended apex of the next succeeding chamber. The downwardly-extended chambers are of smaller diameter to leave more space between their edges or periphery and the walls of the cylinder. By this means the heat in traveling from the heating appliance upward is controlled and caused to pass through a tortuous passage in contact with the full surface of the under wall of each of the spreading-chambers until delivered past the reservoir C through the vent and flue or exit E.

In all of the joints in the connecting-pipes A^7 care is taken to provide for the expansion and contraction due to the intermittent use of the heat. The joints about the peripheries of the spreading-chambers are made steam-tight.

In the construction of the spreading-chambers A^5 and A^8 care is taken to have as small amount of space below the introduction of the connecting-pipes A^6 as is possible, and thereby prevent the formation of dead-water and consequent accumulation of precipitation.

The water from the instant it enters the space A^2 until it has passed through the spreading-chamber A^3, pipe A^4, chamber A^5, connections A^7, and intermediate chambers A^8 has been under the influence of the heat supplied by the heating appliance B and spread out in a thin layer, so as to be in all parts subjected. Consequently it arrives in the reservoir C in a heated condition, where it is maintained until drawn off by the faucets C′ C^2.

The bent or flue E forms the exit for the heat from within the cylinder of the heater. When the water has been heated sufficiently and it is desired to retain it in the reservoir, the damper E′ in the vent (which during the heating has remained open) is closed. By closing this damper the whole volume of heated air contained within the cylinder is retained within the upper part of the reservoir C. The radiation from the grate-bars of the heating appliance B is carried into the upper part of the cylinder, where it is prevented from escaping by means of the damper E′. In this manner the water contained within the reservoir C is maintained heated for quite a length of time after the heating appliance has been discontinued.

Special attention is directed to the lowermost heating-chamber A^5 and the connection between said chamber and the supply-pipe A^4. It will be seen that said heating-chamber is substantially cone-shaped with its apex at the top and that the central supply-pipe has its exit-opening below the upper point of the chamber. Upwardly-extending cross-pipes A^9 (here shown as made integral with each other and with the lower plate of the chamber) connect the pipe and the under side of the chamber. By reason of this construction thin columns of water are held in the branch or cross pipes, and these columns are successively rapidly heated and fed to the chamber. Attention should also be given to the parts for closing the upper end of the casing. In building these heaters the double-wall casing is first constructed, the heating-chambers, reservoir, &c., are then assembled in the casing, and, finally, the top plates A^{10} A^{11} are applied, said plates being for the purpose of permitting assembling of the heating-chamber, &c., as indicated, separate from the side walls of the casing. The plates A^{10} A^{11} are when in place connected, respectively, to the inner and outer walls and the vent or flue E is formed upon the inner top plate A^{10}, said flue having about it at a suitable point a lateral flange A^{12}. The upper or outer top plate is provided with an opening for the passage of the flue, and about said opening it rests upon the flange A^{12}. Thus the heating-chambers and other internal parts are readily assembled before the application of the top plates, and when said plates are applied they effectually close the casing and form between them the spreading-chamber A^3. The flue upon the inner top plate serves to hold said plates and to steady them.

By means of this invention, as herein described, I am able to heat a small quantity of water rapidly and perfectly to confine it for future use within a reservoir so constructed and arranged as to lose little or none of its heat by radiation to draw off the waters of different temperatures, as desired, from the said reservoir.

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

1. In a water-heater or the like adapted to receive its supply of heat at the bottom, a vertical series of connected water-chambers, the lowermost of said chambers being substantially cone shape with the apex at the highest point, a central supply-pipe having its exit-opening below the upper point of the lowermost chamber, upwardly-extending cross-pipes connecting the exit-opening of the supply-pipe with the under side of the lowermost chamber, and a discharge-opening connected with the water-chambers; substantially as described.

2. In a device of the nature indicated, a casing having double walls with a water-space between them, a separate top plate closing the inner casing and connected to its walls, a series of water-chambers arranged within the casing and having communication with the space above the before-mentioned top plate, an upwardly-extending flue upon said top plate and communicating with the interior of the casing, a lateral flange upon said flue above the top plate, and an outer top plate connected to the outer wall of the casing and having an opening therethrough for the passage of the flue, the said outer casing being in engagement with the flange; substantially as described.

In testimony whereof I have hereunto set my hand this 28th day of December, 1897.

JAMES McCARTNEY.

Witnesses:

E. F. MURDOCK,

MAYNARD HANNS.