

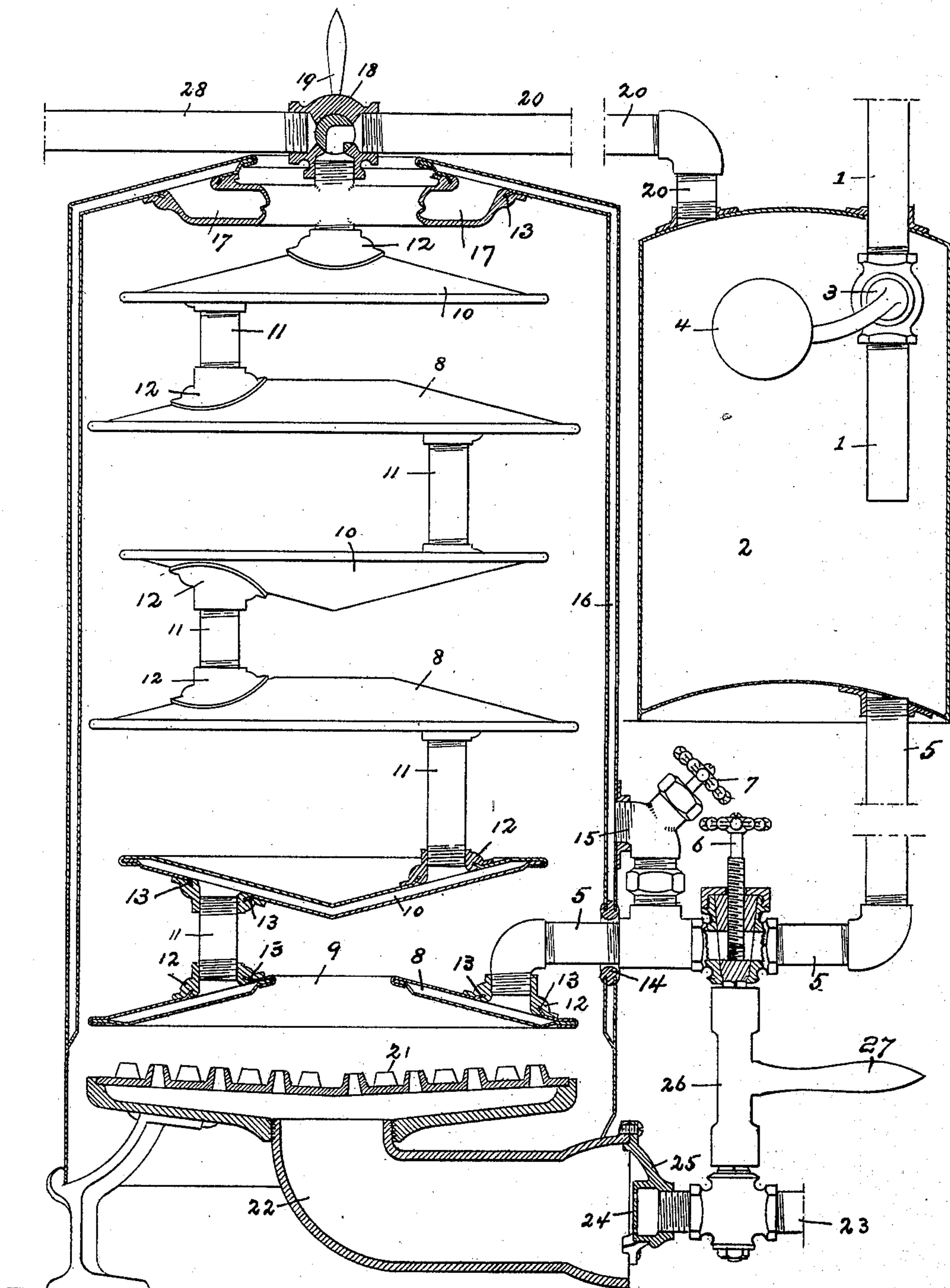
No. 719,356.

PATENTED JAN. 27, 1903.

J. McCARTNEY.
WATER HEATER.

APPLICATION FILED JAN. 25, 1900.

NO MODEL.



WITNESSES:

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UNITED STATES PATENT OFFICE.

JAMES MCCARTNEY, OF SAN FRANCISCO, CALIFORNIA.

WATER-HEATER.

SPECIFICATION forming part of Letters Patent No. 719,356, dated January 27, 1903.

Application filed January 25, 1900. Serial No. 2,793. (No model.)

To all whom it may concern:

Be it known that I, JAMES MCCARTNEY, a citizen of the United States, residing at 4034 Seventeenth street, in the city and county of San Francisco 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 distributors.

The drawing is a vertical section of the heater and expansion and supply tank, showing the connecting pipes and valves in full lines.

The water-heater employed in the present invention is an improvement on that described and illustrated in the Letters Patent issued to me the 13th day of September, 1898, bearing No. 610,554. In the Letters Patent referred to the water is admitted between the outer walls of the heating-chamber and delivered at the top of the same to a down-pipe centrally located, which delivered the water to the lower end of the pile of spreading-disks, up which the water traveled to an outlet-pipe leading from the uppermost disk. This outlet-pipe was open, so that back pressure on the water passing through the heater was avoided. If such back pressure is produced, the water is held in the central pipe until steam is developed therein, which, rising through the pipe, causes a rumbling in the heater. It is to overcome this objection that I now introduce the supply-pipe 5 through the outer wall of the heating-chamber at the level of the lower disk, with which it is connected by a screw-threaded connection. The water is then carried upward through the spreading disks 8 and 10 to the outlet-pipe 20, which distributes it in the present instance for heating the house, suitable radiators being placed in the line of the pipe 20. The water is finally delivered to the expansion-tank 2 of ordinary construction. This expansion-tank receives the street or other supply water through the pipe 1, when the water in the tank 2 falls, so as to lower the float 4 and open the valve 3. The

supply-pipe 5 extends from the bottom of the tank and enters the lower disk, as described. The volume of the flow of the water into the disks is regulated by the valve 6.

The circulation of the water contained in the pipes 20 and 5, the tank 2, and the disks 8 and 10 is established and maintained by the heater 21, in which commingled atmospheric air and gas is burned. The gas is delivered from a pipe 23 through a perforated tip 24 into the mixing-chamber 22, while atmospheric air is received in the same chamber between the legs of the spider 25, in which the tip 24 is formed. The admission of the gas through the pipe 23 and the water through pipe 5 is regulated by valves on each pipe, which are connected by a bar 26, having a handle 27. By this means the flow of gas and water is simultaneously started or suspended, and the diminution of each is proportionate to that of the other. As the quantity of water flowing through the disks for a given quantity of heat units varies the temperature of the water delivered from the disks, this is independently regulated by the valve 6. This valve is of a composite type, being the ordinary rotary valve having a transverse passage cut through it, through which the water flows and which is rotated by the bar 26. The valve in this instance is vertically bored to receive the screw-valve 6, the inner end of which is adapted to move across the transverse opening, and thereby diminish the said opening and the quantity of water admitted through the same. By means of this construction a small quantity of exceedingly-hot water may be drawn directly from the machine through the pipe 28, the valve 19 being turned to cut off the pipe 20 and pass the water into the pipe 28. In this manner the heater may serve the double purpose of a circulatory heater and an instantaneous heater, from which small quantities of water heated to a high temperature may be drawn.

In the heater heretofore constructed and in conformity with the patent above referred to the water has been passed from disk to disk through two or more connecting short pipes, which have been located to lead the water from the highest point of the lower disk to the lowermost point of the upper disk. This arrangement has been found to be struc-

naturally difficult and has shortened the passage
 of the water through the disks where it has
 been most favorably exposed to the heat—
 that is, while spread in a thin sheet. In the
 5 present invention the short pipes 11 connect
 the adjoining disks at the outer edges of and
 on opposite sides diametrically, each pipe be-
 ing located the same distance from the cen-
 10 ter. They are secured to the disks by being
 screwed into the threaded bosses 12. These
 are attached to the disks by the edges 13 be-
 ing upturned to fit within a groove in the
 abutting face of the boss that the inner edge
 15 of the opening of the boss may be turned over
 to clasp the edge 13. This makes a firm and
 tight joint when the disks are galvanized af-
 ter the bosses are in place and the sides of
 the disk are joined, as shown in the drawings.
 20 By this arrangement of the pipes the water
 admitted on the one side of the disk is com-
 pelled to travel to the opposite side of the
 disk before rising to the next disk, thus hold-
 ing the water in contact with the heat for a
 greater length of time. The disks are con-
 25 structed, as shown in the drawings, in two
 sets, the one set, 8, having a central opening
 9, through which the heat passes to strike
 upon the inverted apex of the disks 10, which
 30 are of less diameter than the disks 8 and have
 not the central opening. In mounting these
 disks are alternated. The uppermost disk 10
 is not inverted, as are the lower ones of the
 same set, the apex being uppermost and at the
 point being provided with a boss 12, leading
 35 to the outlet-pipe through the valve 19. As
 in the patent above referred to, the water is
 spread in these disks in a thin sheet across
 the path of the heat to compel the same to
 travel in intimate contact therewith. As
 40 stated, however, by the present construction,
 the water is for a greater time or through a
 greater area held in contact with the heat.
 The side walls of the chamber become in-
 tensely heated. It is to utilize this heat and
 45 at the same time overcome the objection of
 the heating of the apartment in which the
 heater is placed that I use the double wall
 forming a water-jacket 16. This is connected
 by the pipe 15 to the supply-pipe 5. The wa-
 50 ter as heated in the jacket rises and passes
 out through the bridge-pipe 17 and from
 thence through the valve 19 in the T connec-
 tion 18 into the pipe 20. The volume of wa-
 ter entering the jacket 16 regulates the speed
 55 at which it flows through the jacket, and con-
 sequently the temperature of the water on
 leaving the jacket. This regulation is effect-
 ed in the present construction by the valve 7.
 By means of this construction the heating-
 60 chamber is surrounded by water which ab-
 sorbs the heat which would otherwise be ra-

diated into the apartment; also, when the in-
 stantaneous feature is desired for use the
 supply to the jacket may be so diminished as
 to heat the water to the desired temperature 65
 before gaining the outlet-pipe 28.

In a hot-water heat-radiation system em-
 ploying the heater described the circulation
 is established and maintained by causing the
 water to spread in attenuated sheets in con- 70
 tact with the heat, so that it rapidly absorbs
 the heat. This water is passed and repassed
 through the spreading-chambers to be reheat-
 ed and again sent out to the heat-radiators
 located on the outlet or delivery pipe. The 75
 flow of the water through the spreading-cham-
 bers may be so regulated as to absorb the
 maximum amount of the heat of combustion
 in the heating-chamber or otherwise and by
 so doing regulate the heating effect of the 80
 system. Also by the double-valved arrange-
 ment the heat of combustion is regulated in
 proportion to the quantity of water and the
 speed of its circulation, thereby absorbing
 thoroughly the heat units of combustion into 85
 the water.

I am aware that hot-water heat-radiation
 systems having a heater through which the
 water is passed and repassed have been used,
 and such I do not claim. Further, I am aware 90
 that water-heaters in which chambers for
 spreading the water in thin sheets across the
 path of the heat have been used are not
 broadly new and such I do not so claim; but

What I do claim is—

1. In a water-heater, a water-jacket form- 95
 ing the wall of the combustion-chamber and
 having at its top an opening for the exit of
 the products of combustion, a bridge-pipe
 extending across said opening and communi- 100
 cating with the water-jacket, members with-
 in said chamber and providing a passage for
 containing water during the time of its heat-
 ing, said passage emptying into said bridge-
 pipe, supply-pipes for the said passage and 105
 the water-jacket, and an outlet-pipe from
 said bridge-pipe; substantially as described.

2. A water-heating disk having an opening
 therein, and a boss for the attachment of a
 pipe on said disk about said opening, said 110
 boss having a groove in its face adjacent the
 disk into which groove fits the edge of the
 disk surrounding the said opening, the inner
 edge of the opening of the boss being turned
 over to clasp the said disk edge; substantially 115
 as described.

In testimony whereof I have hereunto set
 my hand this 22d day of November, 1899.

JAMES McCARTNEY.

Witnesses:

E. F. MURDOCK,
 G. W. MARSH.