

No. 766,964.

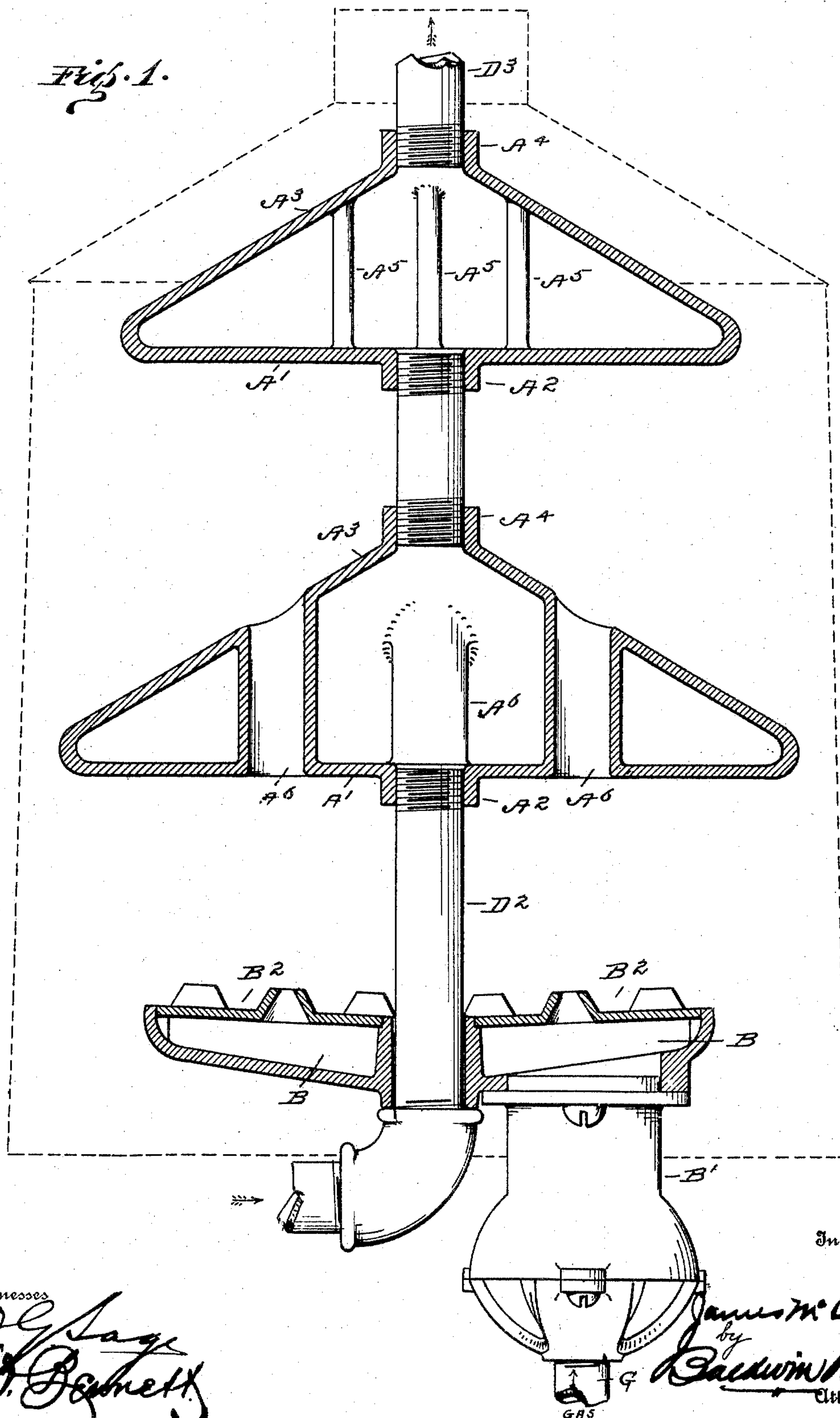
PATENTED AUG. 9, 1904.

J. McCARTNEY.
WATER HEATER.

APPLICATION FILED DEC. 12, 1903.

NO MODEL.

2 SHEETS—SHEET 1.



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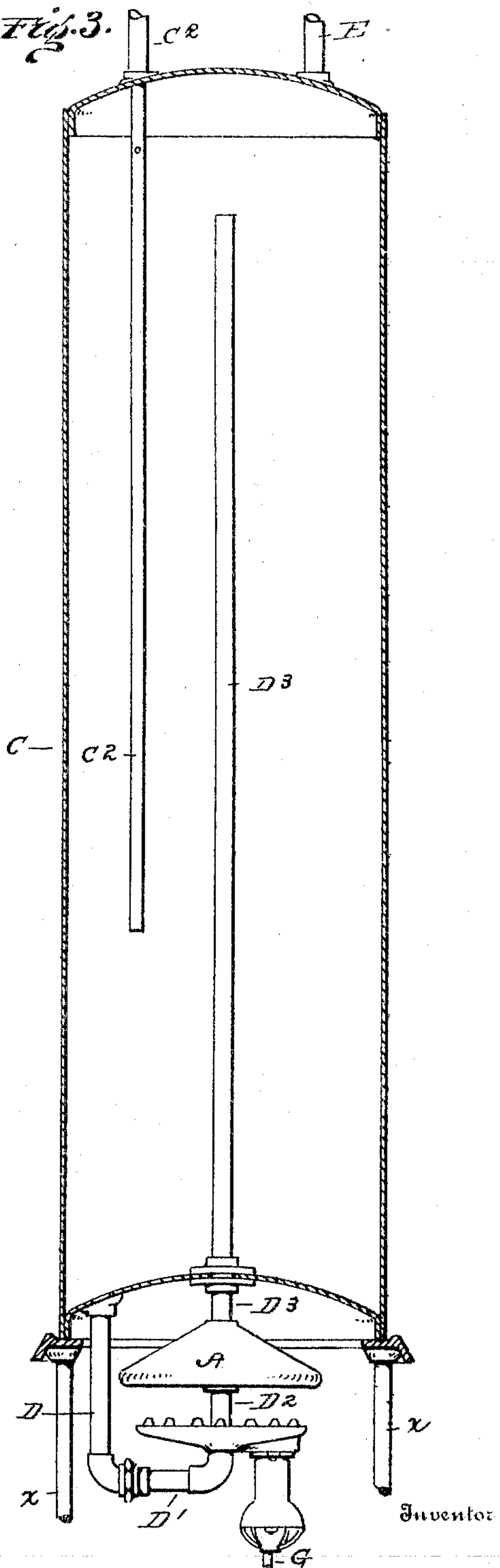
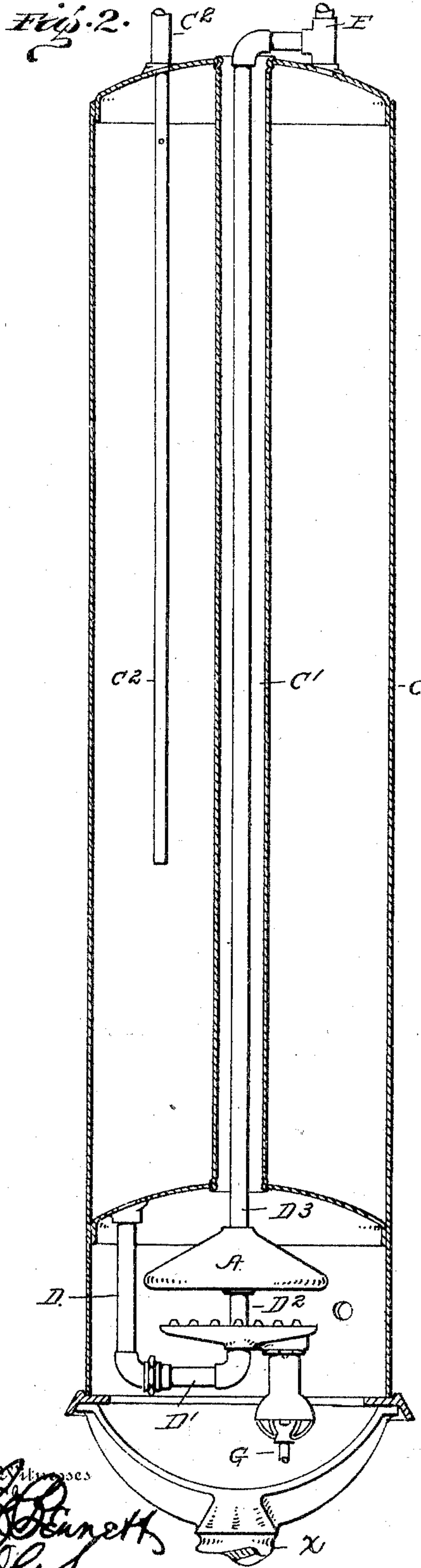
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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

JAMES McCARTNEY, OF GLENELLEN, CALIFORNIA.

WATER-HEATER.

SPECIFICATION forming part of Letters Patent No. 766,964, dated August 9, 1904.

Application filed December 12, 1903. Serial No. 184,875. (No model.)

To all whom it may concern:

Be it known that I, JAMES McCARTNEY, a citizen of the United States, residing at and whose post-office address is in the city of Glenellen, county of Sonoma, 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 the 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 a heating-disk of novel form and construction, combined with other elements new and old in the art to accomplish the desired results.

The objects sought to be accomplished are to construct a water-heater of great simplicity and power without departing too radically from the existing systems of storage and distribution of hot water, and thus accomplishing a great saving in the cost of manufacture.

With these objects in view the invention consists of a coniform hollow disk forming an enlarged hollow-disk-like receptacle constituting a spreader. This spreader operates to spread the water over an extended heated surface and is provided with inlet and outlet openings, respectively, in its horizontal bottom and at its apex. The inlet is fed from the bottom of the boiler and delivers to the top of the boiler. The disk is heated by a heating means thereunder, the products of combustion escaping upwardly through a central flue through the boiler or in the absence of such flue escaping laterally from beneath the boiler in the event of an overgeneration of heat in excess of the absorbent power of the disk and boiler.

In the drawings, Figure 1 is a vertical cross-section of a series of heating-disks and burner constructed in accordance with this invention. Fig. 2 is a vertical cross-section of a complete water-heater constructed in accordance with this invention. Fig. 3 is a similar view of a modification of the same.

In detail the construction consists of a hollow disk A, cast in one integral piece, having the flat bottom A', having a hollow lug A²

thereon, and the conical top A³ of said disk joins the bottom A' at the periphery thereof, converging to the center and terminating in the hollow lug A⁴. The disk must be sufficiently strong to withstand the whole service-water pressure. Therefore it is advisable to strengthen it by the internal tie-rods A⁵, extending between the top and bottom. These tie-rods are placed by forming the core with holes where the tie-rods are to stand. As the molten metal fills the mold the holes in the core will mold the tie-rods. In instances where a plurality of disks are used the best results are obtained by alternate large and small disks, the larger disks having the openings A⁶ therethrough for the passage of a portion of the products of combustion, the walls of these passages acting as tie-rods.

The heating means consists of a gas-burner consisting of a hollow annular mixing-chamber B, into which a mixture of gas and air is liberated through the throat B'. The flame escapes through the twyers in the perforated top B².

The boiler or reservoir C consists of the usual "kitchen-boiler" modified by riveting the bottom above the lower edge of the shell a sufficient distance to form a chamber for the reception of the heating means within the shell of the boiler and perforating the top and bottom centrally and expanding and beading a boiler-tube between to form an air-passage through the center of the boiler.

The cold water is led into the boiler through the inlet-pipe C² in the usual manner and reaches the heating-disk through the connecting-pipe D, which leads downward from near the outer edge of the bottom of the tank, thence across D', thence upward, D², through the opening in the center of the burner to the lug A² on the bottom of the disk. From the top of the disk the pipe D³ leads upwardly within the passage C' and connects directly with the service distributing-pipe E. The combination thus assembled is adapted to be installed and connected, as is common, to the usual kitchen-boiler, with the addition of the necessary fuel connections G, using the stand X for free or exposed connections.

The modification shown in Fig. 3 is exactly

similar in operation to the combination just described up to the point of delivering the hot water to the boiler. In the modification the common kitchen-boiler of commerce with-

5 out any alteration is used, the pipe D^3 extending upwardly through the body of water in the tank and terminating near the top of the boiler, the hot water passing into the service-pipe in the usual manner.

10 The connection and operation of the heater is as follows: The cold water is introduced into the boiler through the pipe C^2 , which extends downwardly into the body of the boiler to liberate the cold below the hot water. From

15 the bottom of the tank the cold water is led through the heating means and subjected to the intense heat from the burner and rises and is liberated at the top of the boiler either internally or externally, as the case may be.

20 The flame from the burner rises against the disk, which absorbs the heat in proportion to the exposed surface. The surplus leaves the surface of the disk and is absorbed by the bottom of the boiler, which is always cold, until all the water in the boiler has circulated

25 repeatedly through the heating means, when the burner should be shut off. There is a constant internal circulation until a faucet in the service system is opened, in which event

30 the water will shunt the boiler and enter directly into the service from the disk. The direct connection from the disk to the service insures hot water immediately after lighting the burner, at the same time permitting the

35 hot water to accumulate within the boiler should no demand be made on the system.

Particular claim is made for the peculiar shape and formation of the disk, which is the result of long and careful experimenting, during

40 which time many patents have been granted to me covering many special forms and connections of disks, &c., in this art. A cardinal principle in water-heating is to enter the cold water at the lowest point and release it at the

45 highest point of the heating device. The action of the water within the disk under the influence of heat is substantially this: Taking cognizance of the cold zone existing in the core of a Bunsen or other concentrated flame,

50 entrance to the disk is never opposed by the heat. In practice the heat of the flame gradually increases toward the periphery of the disk and extends over the top thereof. As a result the comparatively thin body of water

55 at the converging walls or attenuated portion of said disk is heated to a high degree, while the water in the center of the disk is comparatively cold. The tendency of the heated water is to rise and upon contacting with the

60 converging top of the disk is directed to the central outlet, the water in the central portion of the disk moving laterally toward the periphery thereof. The hot water taking precedence over the cold, the latter is prevented

65 from passing directly through the core of the

disk. Therefore only hot water can escape from the disk. The natural disposition of the flame to converge to the center is unopposed by the top of the disk, resulting in the whole surface of the disk top and bottom receiving

70 the maximum power of the flame without in the least diminishing the natural draft thereof.

While it is preferred to construct the disk integrally, obviously it could be built up of sheet metal—however not without the practical

75 certainty of leaky joints therein.

The construction illustrated in Fig. 1 is the more powerful in results because of the increased heating-surface in the central passage C' and the exposed surface of the pipe

80 D^3 , which is purchased by the increased first cost incident to departing from the conventional type of boiler.

Having thus described this invention, what is claimed, and desired to be secured by Letters

85 Patent, is—

1. A water-heater comprising a boiler with its bottom set above the lower edge of the shell, a flue extending longitudinally there-through, a hollow coniform heating-disk ar-

90 ranged in the lower end of said flue, a pipe communicating between said disk and the lower end of said boiler, a pipe leading from the top of said disk upwardly through said flue, a hot-water-service-system pipe commu-

95 nicating with said boiler and also communicating with the pipe leading from the said flue, and means for heating said disk and the bottom of the boiler.

2. A water-heater comprising a vertical

100 boiler having inlet and outlets at the top; a hollow coniform heating-disk with a pipe connection from the bottom of the boiler to the bottom of the disk, and a pipe connection leading from the top of the disk upwardly

105 through the bottom of the boiler to the top portion thereof; a burner supported by the pipe connection to the bottom of the disk, and adapted to deliver its heat against the disk, and the bottom of the boiler.

110

3. A water-heater comprising a plurality of hollow coniform heating-disks, having a horizontal bottom with a central inlet-opening therethrough, and a conical top converging from the periphery to the center opening, tie-

115 rods extending between the top and bottom walls of said disk, and pipe-nipples between said disks, and pipe connections leading into the bottom disk, and out of the top disk; and a burner supported by the pipe leading into

120 the bottom disk.

4. In a water-heater, the combination with a vertical boiler, of a flue extending longitudinally through the same, a thin hollow receptacle constituting a water-spreading means

125 arranged beneath the bottom of said boiler, a tube extending beneath said water-spreading means and communicating between the same and the bottom of the boiler, a heater carried by said tube in position for directing its heat

130

units against said water-spreading means, and a tube connected with said water-spreading means and extending upwardly through said flue and communicating, at its upper end, with
5 the service system.

5. In a water-heater, the combination with a boiler, of a flue extending longitudinally throughout the length thereof, a thin hollow receptacle constituting a water-spreading
10 means beneath the bottom of said boiler, a pipe communicating with said water-spreading means and extending upwardly through-

out the length of the flue and communicating, at its upper end, directly with the service system, means for supplying water to said
15 water-spreading means, and means for heating said water-spreading means.

In testimony whereof I have hereunto set my hand this 4th day of December, 1903.

JAMES McCARTNEY.

Witnesses:

BALDWIN VALE,
A. J. HENRY.