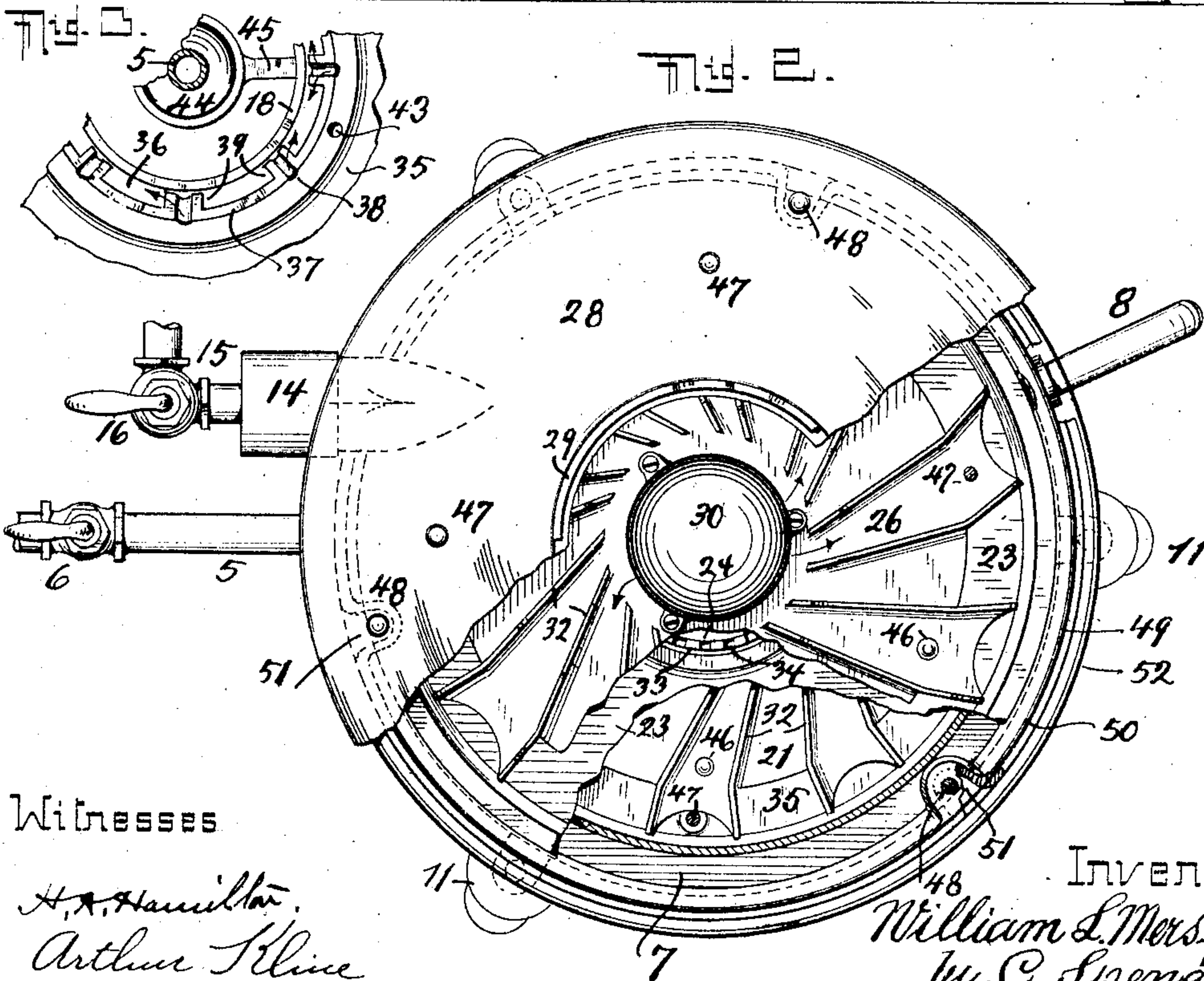
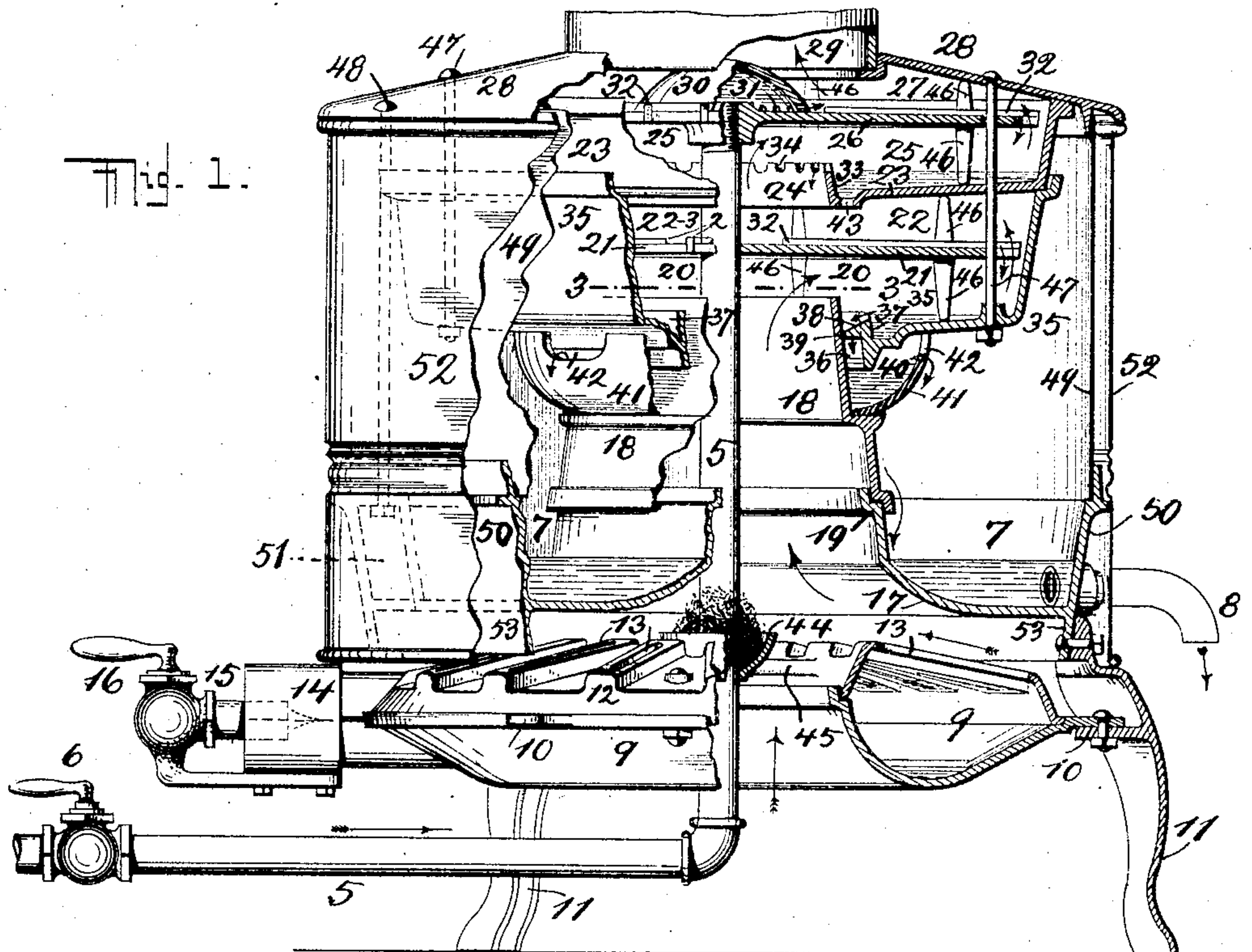


No. 785,905.

PATENTED MAR. 28, 1905.

W. L. MERSFELDER
WATER HEATER.

APPLICATION FILED DEC. 21, 1904.



Witnesses

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UNITED STATES PATENT OFFICE.

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WATER-HEATER.

SPECIFICATION forming part of Letters Patent No. 785,905, dated March 28, 1905.

Application filed December 21, 1904. Serial No. 237,765.

To all whom it may concern:

Be it known that I, WILLIAM L. MERSFELDER, a citizen of the United States, residing in Norwood, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Water-Heaters; and I do declare the following to be a clear, full, and exact description thereof, attention being called to the accompanying drawings, with the reference characters marked thereon, which form also a part of this specification.

This invention relates to improvements in devices for heating water and where such is done while the water is caused to pass through the device to which it is admitted cold and which it leaves hot.

The object of this invention is to obtain the desired effect—that is, highest temperature—in the possibly shortest space of time after the water is admitted to the device.

The invention consists of the particular construction in general and in detail to obtain the general object and as the same is hereinafter shown and described.

In the following specification, and particularly pointed out in the claims, is found a full description of the invention, together with its operation, parts, and construction, which latter is also illustrated in the accompanying drawings, in which—

Figure 1 is a sectional side elevation with parts broken away to show the various features of the construction. Fig. 2 is a top view, also with parts broken away. Fig. 3 is a sectional detail view taken on line 3 3 of Fig. 1.

The device consists, substantially, of a general inclosure, a central heating-flue, and horizontal partitions arranged above the same, with spaces between them through which the heated air discharged from said flue is passed and in which spaces it meets and passes through the water, which comes from opposite direction, said water being alternately spread and directed toward the periphery of the device by one partition and collected again and guided back toward the center by the next partition, thus increasing the space and time during which water and

heat remain in contact with each other. The arrangement is, further, such that the water in all parts of its passage from the time it enters the device until it leaves the same is exposed to heat either directly or by contact with heated surfaces. The water is supplied to the device through a pipe 5, which is generally a continuation or part of the house-service pipes of a water-supply system. Passage through this pipe is controlled by a cock 6. The water after being heated while passing through the device collects in an annular chamber 7, from where it discharges through an outlet-nozzle 8. No cock controls this outlet, which is normally open, the passage through it being entirely subject to manipulation of cock 6, which admits the cold water. Overheating, generation of steam, and raising of dangerous pressure are thus positively prevented.

The heat is provided by means of a burner 9 in form of an annular chamber supported by opposite lugs 10, one projecting from the outside of the burner at each point of its connection and one from the inside of each one of the legs 11. The top surface of this chamber is inclined, as shown, and has radial ridges 12, in the upper surface of each of which slots 13 are provided, which form gas-outlets. 14 is the supply-inlet to this burner and arranged in the usual manner, so as to admit simultaneously air and gas, this latter coming from a gas-pipe 15, controlled by a cock 16. As best shown in Fig. 2, it will be noticed that this inlet is arranged tangential to the center or otherwise than radial, the object being to prevent reaction by creation of opposing currents and to obtain a more complete mixture of gas and air.

The necessary air to be heated by the burner is admitted between the inclined top of this latter and similarly-inclined bottom 17 of collecting-chamber 7. The combustion is materially aided by additional air passing also in between ridges 12. Air enters further through the central space surrounded by the burner. Air, heat, and products of combustion pass up through a central flue 18, the wall which forms this latter resting at its lower edge on the upturned edge 19 of the

chamber-bottom 17. From here the heat passes into a space 20, under a spreader 21, and up around the outer edge of the same into a space 22 above it and under a pan-shaped collector 23. It passes out of this space upwardly through a central opening 24 into a space 25 and under another spreader, 26, similar to the one mentioned before. It passes up around the outer edge of this spreader and into a space 27 above the same and under the top 28 of the device. From here the exit takes place through a central opening, which may be provided with a pipe 29. The heated air in its passage, as described, through the device heats thoroughly all parts of this latter with which it comes in contact, as well as the spaces through which it passes. This includes also the upright branch of the water-pipe, which passes through the center of the device, entering through the space surrounded by the annular burner. This pipe passes through the upper spreader 26, which is centered thereby and may be mounted thereon. It discharges immediately above this spreader and into a distributing-head in shape of an inverted cup 30, suitably attached to spreader 26 and notched around its lower edge to provide outlet-openings, whereby the water discharged by pipe 5 is distributed in form of a sheet over the entire surface of the heated spreader. This distribution is aided by ridges 32, whereby the upper surface of the spreader is subdivided into gutters, and by arranging these ridges tangentially, as shown, the length of these gutters is increased and the flow of the water retarded, so that the same remains longer in contact with the heated surface.

Of the discharge-openings 31 one may be opposite the inner end of each of these gutters, the length of which latter varies, alternate ones being longer, as best shown in Fig. 2, which effect is obtained by notching the outer edge of the spreaders, as shown. The water thus spread out drops over the outer edge of this spreader and through space 25 into a pan-shaped collector 23, whereby it is directed toward the center, falling over a vertical margin or curb 33, which surrounds opening 24 and the upper edge of which is notched, as shown at 34. The water is thereby broken up in numerous small jets while passing through the heated air, which meets them in opening 24, and in this shape drops also through the heated space 22 and onto the hot spreader 21. This lower spreader is similar in construction to spreader 26 described and is likewise provided with ridges forming gutters between which the water is spread and distributed. In this shape the water drops over the outer edge of this spreader and through the heated space 20 into another collector, 35, whereby it is directed again toward the center and toward a central discharge-opening. The upper end

of flue 18 projects through this discharge-opening, which thus assumes an annular shape, as best shown in Fig. 3 at 36. Here the water passes over a marginal curb 37 and is broken up in jets by notches 38. These notches are extended to form gutters in the upper surface of drip-noses 39, whereby the water is directed against the outer surface of flue 18, so that while passing down it does so in contact with this surface, which is intensely hot. The water is held for some time in contact with this surface by an annular chamber formed by a curved wall 41, supported on the outside of flue 18. It overflows from here through openings 42 and runs down on the outside of wall 41 and over the outside of the lower part of flue 18, which is also intensely hot, and arrives finally in the annular collecting-chamber 7, from whence it discharges through outlet 8. The heating still continues in this chamber, since bottom 17 of the same is directly above the burner. It will now be noted that the water on every part of its way while passing through the device and from the time it enters the upright part of pipe 5 until it passes out at 8 is exposed to contact with heated surfaces. In addition it is exposed to direct contact with the heated air in the spaces 27, 25, 22, and 20, where water and heat meet and pass through each other in opposite directions. The normally open outlet 8 prevents all possibility of any accidents by generation of steam and high pressure.

If hot water is wanted, the cold-water cock 6 is turned on. If the supply has been satisfied, the water is turned off by the same cock. Nothing remains in the heater, since outlet 8 is in the lowest part thereof and everything drains out.

Collectors 23 and 35 are each provided with an annular depression around their deepest part, in which drain-outlets 43 are provided. Wall 41 does not rest with a water-tight fit on flue 18, so that the water may readily drain out, in addition to which openings or slots may also be provided for the same purpose.

Drippings from condensation or sweating are prevented from reaching the floor on the inside of flue 18 by the particular formation of the joint between its lower edge and edge 19, and whereby such drippings are guided into chamber 7. It is prevented on pipe 5 by means of a cup 44, surrounding said pipe, in which said drippings collect and are evaporated by the heat, the cup being for such purpose arranged so as to be surrounded by the burner to be heated thereby. This procedure may be assisted by providing heat-absorbent material like asbestos or mineral wool in said cup. The cup is supported by arms 45, projecting from the inner side of the burner.

Collectors 23 and 35 are pan or pot shaped

structures resting on each other, the upper one centering on the lower one, while the latter is centered on flue 18 by means of drip-noses 39. Flue 18 centers on collecting-chamber 7. Spreaders 21 and 26 are centered on water-pipe 5 and vertically spaced by means of projections or spacers 46. These parts are held together by bolts 47, passing through the lower collector 35 and through top 28, with all parts between. Additional bolts 48 serve to hold this connected structure to the lower part—that is, to collecting-chamber 7. The space between these two is closed by a surrounding shell 49, held between top 28 and the upper edge of the outer wall 50 of the collecting-chamber. The lower ends of bolts 48 are seated in external recesses 51, formed in the outer wall 50. Legs 11 are bolted to the casting forming collecting-chamber 7, and burner 9 may be supported on this latter or on the legs, as shown.

52 is merely an ornamental shell to hide and cover the inner shell 49, which is subject to discoloration due to the heat. The space between these two shells prevents discoloration of the outer one, which may be supported by resting on legs 11.

53 is an annular flange on the under side of the collecting-chamber and serves to direct the heat inwardly and upwardly.

Having described my invention, I claim as new—

1. In a water-heater, the combination of a series of circular spreaders, means whereby water is discharged upon them, tangentially-arranged ridges on these spreaders whereby their upper surface is subdivided into gutters by which the water is distributed, the edge of these spreaders being notched out between alternate gutters, a collecting-chamber below these spreaders, an outlet therefrom and a burner to supply heat to the device.

2. In a water-heater, the combination of a series of spreaders and collectors alternately directing the water in opposite directions, the water passing over the outer edge of the spreaders onto the collectors and through

central openings in these collectors, a marginal curb surrounding each of these openings, notches in the upper edge of these curbs whereby the water is discharged in jets, a collecting-chamber below these devices, an outlet therefrom and means to supply heat to the device.

3. In a water-heater, the combination of a pan-shaped collector with a central discharge-opening, means to supply water to it, a flue below it and extending with its upper end through this opening and of a size to leave a space between it and the margin of this opening, drip-noses directing the water from this collector across this space and against the outer surface of this flue, a collecting-chamber which receives this water, an outlet therefrom and a burner below the flue.

4. In a water-heater, the combination of a central flue, a burner below, a pan-shaped device above it and adapted to discharge water against the outer side of this flue, a curved wall supported on this flue in a manner to form an annular chamber around the same and provided with outlets for the water, a collecting-chamber below and an outlet therefrom for the heated water.

5. In a water-heater, the combination of an inclosing shell, an annular burner, an annular collecting-chamber above the same, an outlet therefrom, a central flue projecting upwardly from this chamber, alternately-arranged circular spreaders and collectors with imperforate bottoms supported above this flue, and vertically spaced between their outer edges, the water passing down over the outer edge of the spreaders, onto the collectors, a central supply-pipe passing upwardly through all these devices and a distributing-head at the upper end of the same discharging the water laterally over the topmost spreader.

In testimony whereof I hereunto set my signature in the presence of two witnesses.

WILLIAM L. MERSFELDER.

Witnesses:

C. SPENGEL,

ARTHUR KLINE.