

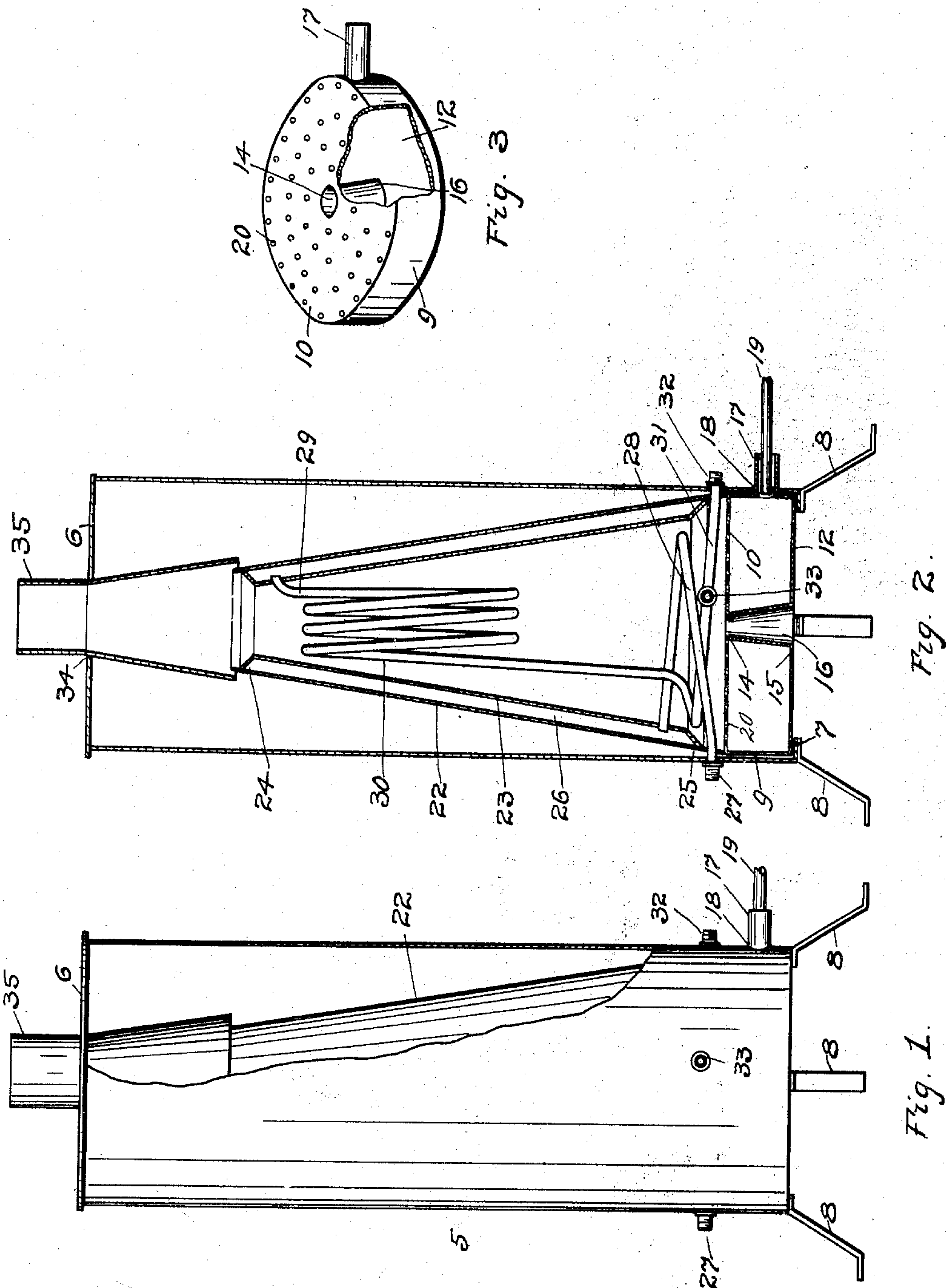
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H. L. FESSLER & R. MICHAELS.

WATER HEATER.

APPLICATION FILED FEB. 15, 1906.



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# UNITED STATES PATENT OFFICE.

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## WATER-HEATER.

No. 850,634.

Specification of Letters Patent.

Patented April 16, 1907.

Application filed February 15, 1906. Serial No. 301,211.

*To all whom it may concern:*

Be it known that we, HARVEY L. FESSLER and ROBERT MICHAELS, citizens of the United States of America, and residents, respectively, of Kansas City, in the county of Wyandotte and State of Kansas, and Kansas City, in the county of Jackson and State of Missouri, have invented certain new and useful Improvements in Water-Heaters; and we do hereby declare that the following is a full, clear, and exact description of the invention, such as will enable others to make and use the same, reference being had to the accompanying drawings, forming a part of this specification.

The object of the invention is, first, to subject the water to be heated to a broad heating-surface in an area upon which the heat is concentrated; second, to increase the water circulation, and, third, to employ heat-deflecting surfaces within the heating-receptacle.

The invention consists in the novel construction and combination of parts such as will be firstfully described, and then specifically pointed out in the claims.

In the drawings, Figure 1 is a side view of the improved water-heater embodying the invention, a portion of the casing broken away to show the water-circulating receptacle and the flue for the burnt gases. Fig. 2 is a vertical sectional view of the heater as seen in Fig. 1. Fig. 3 is a detail view in perspective of the burner, a portion of the side of the burner being broken away to show the air-duct.

Similar numerals of reference indicate corresponding parts in all the figures of the drawings.

Referring to the drawings, 5 indicates a cylindrical shell or case of the requisite height, open at the bottom and provided with a top 6. Upon the lower portion of the vertical side of the case 5 is an inwardly-extended annular flange 7, and connected with the lower surface of said flange are the legs 8, supporting the case or shell 5 in a vertical position.

Within the case 5 and supported by the upper surface of the flange 7 is the burner 9, which consists of a cylindrical receiver the sides of which extend upwardly a short distance and with which sides are connected

a top plate 10 and a bottom 12. In the top 10 is an opening 14, located at a point equidistant from the sides of the receiver, and in the bottom 12 in a vertical line with the opening 14 is an opening 15, slightly larger in circumference than the opening 12, in which opening is inserted a cone-shaped air-tube or duct 16, and secured at the ends to the sides of the respective openings.

With the side of the receiver 9 is connected one end of a short tube 17, the other end of which tube extends through an opening 18 in the sides of the case 5, in which tube extends the end of a gas-supply pipe 19, the other end having connection with an ordinary gas-service pipe. In the top 10 of the receiver are perforations 20. These perforations are in concentric circles and extend in reduced numbers nearly to the air-flue 16.

The water-circulating receptacle consists of an external cone-shaped shell 22, the larger end portion of which extends from the top 10 of the receiver and near the outer edge of said top upwardly to within a short distance of the top 6 of the case or shell 5. Upon the inner side of the shell 22 is a concentric shell 23, the opposite surfaces of which shells 22 and 23 are arranged a short distance apart. The shell 23 is shorter in length than the shell 22, and the upper end of the shell 23 is bent outwardly at 24 in the direction of and upon the inner surface of the shell 22 and hermetically connected or brazed at the points of connection. The lower end of the shell 23 is bent inwardly in like manner to that of its upper end, the bent portion hermetically connected with the inner surface of the shell 22 at a point a short distance above the line of the top of the burner, thus forming between the shells 22 and 23 a space 26 for the circulation of the water.

27 indicates the water-intake or threaded nozzle upon the outer side of the case 5 with which the water-service pipe is connected. With this nozzle is connected the outer end of the independent coil of pipe 28, which extend through the casing 5 and shell 22 below the water-space, the coil of pipe 28 being adjacent to the top 10 of the gas-burner 9, and the inner end of the coil is extended through the inner shell 23 in communication with the water space or chamber 26 at a point a short



distance upwardly from the inwardly-bent portion 25 of said shell. With the inner shell 23 at a point a short distance downwardly from the upper portion of the shell is connected the upper end 29 of a coil of pipe 30, which coils are arranged in a vertical pendent position, the sides of the coils being drawn inwardly, said coils being supported at a point a short distance downwardly from the point of connection with the shell 23, the other end 31 of which coil extends downwardly nearly to the top 10 of the burner and is coiled in the reverse direction to the coil 28 and extended through the shell 22 below the point of connection of the inner shell 23, thence through the outer shell and provided with a nozzle or connection 32 for the water-distributing pipe. The portion 31 of the pipe 28 is also tapped at a point inwardly from the nozzle 32, and a nozzle 33, connected with the pipe, the nozzle extending through the side of the shell 22 and the outer casing 5, thus affording diverse directions for the distribution of heated water.

In the top 6 of the case 5 is an opening 34, through which extends the upper end of a draft-tube 35, the lower end of which tube is outwardly deflected or cone-shaped and extends within the case to a position concentric with the upper end of the shell 22. The gas for ignition is supplied from a suitable source through the supply-pipe 19 to the burner 9, the regulation in the quality being maintained and the quantity reduced and increased by the usual gas-regulating valve. (Not shown.) The gas which enters the receiver in burner 10 is ignited above the top and the flame is concentrated upon and deflected from one to the other inner surfaces of the shell 23 and upon the upper inwardly-inclined surfaces of said shell. The water is supplied through the coiled pipes 28, and being subjected to heat the water is heated initially and prevents subsequent sweating in the receptacle, enters the water-space 26, and the space being contracted toward the upper end of the shell the passage upward of the water is accompanied with rapid increase in temperature within the area of the heated surfaces of the shell, thence passes through the coils 30, the surfaces of which are directly in the path of the flame, and therefore exposing all surfaces to the heat, thence through the lower coil 31 and conducted to the distributing-point for use.

In the space 26 between the outer and inner shells 22 and 23 the water is spread over the heating-surfaces of the shells, becoming heated in its passage through the heater in degrees of intensity, causing the circulation to become rapid and with a moderate expenditure of fuel, the flame being fed with

air through the air-duct 16, the heat being retained within the case 5. The heater is adapted to afford heated water for instantaneous use in dwellings and whenever its use is required with economy in the quantity of fuel necessary to obtain the higher temperatures of water.

In our invention the heating-coil is independent of the water-circulating coil, so that the water before entering the water-chamber becomes hot and in the circulation of the heated water drives the water ahead or upwardly within the water-chamber without meeting resistance from a cold-water supply from a cold-water-supply inlet. In our invention all the water is heated before entering the pendent coil, upon which the heat is concentrated and from whence discharged.

Such modifications of the invention may be employed as are within the scope of the invention.

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

1. In a water-heater a water-receptacle comprising outer and inner concentric shells having a water-chamber between said shells a water-heating coil within the receptacle connected at its upper end with the upper portion of said water-chamber and the lower discharging end of said coil extending outwardly from said receptacle below the said water-chamber, an independent heating-coil within the said receptacle having one end connected with the lower portion of said water-chamber and the other end extending outwardly from said receptacle below the said water-chamber and connected with the source of supply of water and means for heating said coils.

2. In a water-heater a receptacle for the water comprising outer and inner shells having a water-chamber between said shells and the upper portions of said shells reduced in circumference a pendent heating-coil within the upper portion of said receptacle having one end connected with the upper portion of said water-chamber and having the lower discharging end of said coil extending outwardly from said receptacle an independent heating-coil within the receptacle at the lower end thereof having one end connected with the lower portion of the water-chamber and the other or discharging end extending outwardly from said receptacle and connected with the source of liquid-supply and means for heating said coils.

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