

No. 721,941.

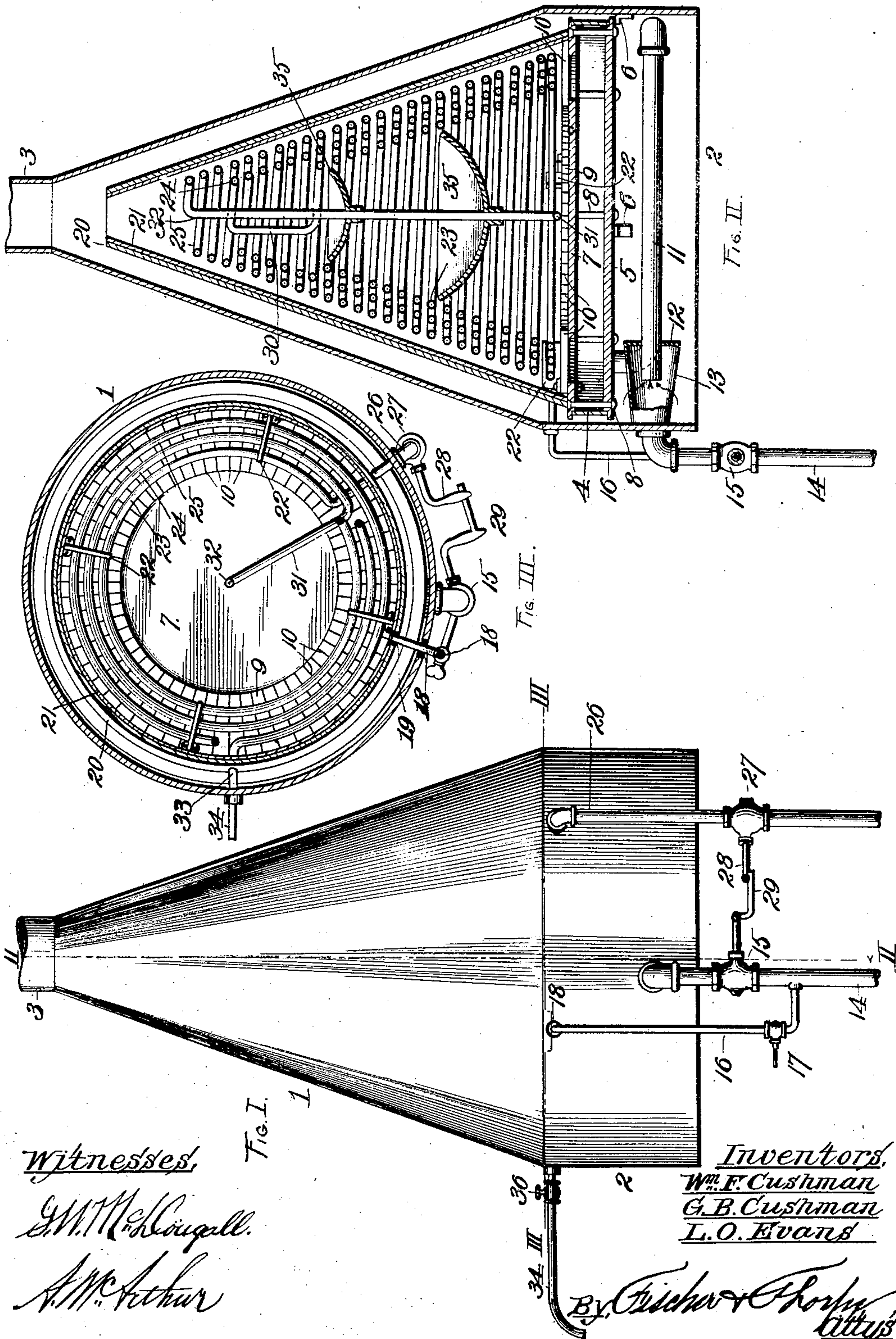
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WATER HEATER.

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NO MODEL.



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# UNITED STATES PATENT OFFICE.

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## WATER-HEATER.

SPECIFICATION forming part of Letters Patent No. 721,941, dated March 3, 1903

Application filed April 15, 1902. Serial No. 103,016. (No model.)

*To all whom it may concern:*

Be it known that we, WILLIAM F. CUSHMAN, LOUIS O. EVANS, and GEORGE B. CUSHMAN, citizens of the United States, residing at Kansas City, in the county of Jackson and State of Missouri, have invented certain new and useful Improvements in Water-Heaters, of which the following is a specification.

Our invention relates to water-heaters; and our object is to produce a device of this character whereby cold water will be transformed into hot water by the time its point of discharge is reached—in other words, what may be termed an “instantaneous heater.”

A further object is to produce a device of this character which can be easily and quickly attached to or removed from gas and water supply pipes and which embodies the desirable features of simplicity, strength, durability, and cheapness of construction and at the same time presents an ornamental and attractive appearance.

With these objects in view the invention consists in certain novel and peculiar features of construction and combinations of parts, as hereinafter described and claimed, and in order that it may be fully understood reference is to be had to the accompanying drawings, in which—

Figure 1 is a view of our improved water-heater as arranged in operative position with respect to gas and water supply pipes. Fig. 2 is a section taken on the line II II of Fig. 1. Fig. 3 is a horizontal section taken on the line III III of Fig. 1.

In the said drawings, 1 designates a conical casing having a cylindrical extension 2 at its lower end and a pipe extension 3 at its upper end, and said casing is adapted to be nickel-plated or otherwise ornamentally finished.

Arranged horizontally and concentrically within the cylindrical portion 2 is a burner, the same being constructed as follows:

4 designates a shallow band or cylinder closed at its lower end by a bottom plate 5, provided with a number of lugs 6, which bear against the cylindrical portion 2 and centralize the burner in said cylinder, thereby providing an annular passage or space between the burner and cylinder, through which the air is free to circulate. The top of the band

or cylinder 4 is closed by a plate 7, and bolts 8, extending down through said top and bottom plates, clamp them firmly upon said band or cylinder. The top plate is provided with an annular rib 9 at its upper side, and said rib is provided with saw-cut burner-orifices 10, through which the gas in the burner escapes. The burner is supported upon a return-bend mixing-tube 11, which communicates at its discharge end with the burner and at its intake end with the mixing-chamber 12, the latter being secured to the casing, as shown, and provided with openings 13, through which air is drawn by the gas injected into the mixing-tube from the upper end of a gas-supply pipe 14, which gas-supply pipe is provided with a controlling-cock 15 and at the opposite side of the latter from the mixing-chamber with a branch or pilot pipe 16, said pilot-pipe being also controlled by a cock 17. The upper end of the pilot-pipe projects horizontally through an opening 18 in the casing and through a registering opening 19 in the cone 20, said cone 20 being arranged concentrically within the conical casing and resting at its lower end upon the burner on the outside of the saw-cut jet-orifices, so as to constitute a combustion-chamber, and in order to retain the heat within said combustion-chamber said cone is provided with an asbestos or equivalent lining 21.

Bolted or otherwise suitably secured upon the rib 9 of the burner are a number of retaining-clips 22 as a support for the hot-water coil, said coil consisting of the inner coil 23, a central coil 24, and the outer coil 25, the base or lower convolutions of said coils fitting in said clips and arranged vertically over the saw-cut jet-orifices 10. The inner coil at its lower end extends outwardly through both casings, as shown in Fig. 3, and is coupled to the upper end of a water-supply pipe 26, and said water-supply pipe is provided with a controlling-cock 27, having its handle 28 normally overlying the cranked handle 29 of the gas-cock 15, so that when the latter is opened by raising said handle it incidentally raises the water-cock handle and permits water to begin to flow into said inner coil. The water passes from the upper end of said coil through a connecting-pipe 30 to the upper end of the



central coil, and after passing down through the latter it passes through the inwardly-extending arm 31 of the lower end of the same and the upwardly-extending central pipe or arm 32, communicating therewith to the upper end of the outer coil 25, and after passing down through the latter it escapes by way of the outwardly-projecting arm 33 and the spout 34, coupled thereto and arranged to discharge into a bath-tub (not shown) or any other suitable receptacle. It has been found in practice that the tendency of the flame from the burner is to draw inwardly toward the center of the coils. For this reason we have mounted upon the central pipe 32 the cup-shaped deflectors 35. One of them is ordinarily sufficient, but we prefer to use two, as shown, one about midway the height of the inner coil and the other at the upper end of said coil.

In starting the burner the operator first turns on the gas through the pilot-pipe and, holding a lighted match or taper opposite opening 18, ignites such gas. He then instantly grasps the cranked handle 29, and thereby opens gas-cock 15 and water-cock 27, this action being almost instantly followed by the ignition of the gas at all of the saw-cut jet-orifices when the pilot-light is extinguished by closing valve 17. The flame from the burner impinges directly upon the lower convolutions of the coils and is maintained upon said coils for practically their entire length by the combined flare of the deflectors outward and the taper of the cone inward. The result is that cold water turned into the bottom of the inner coil is discharged as hot water through spout 34, the water, of course, growing hotter as long as the gas continues to burn. The device not only raises the temperature of the water, but also serves to raise the temperature of the room, a result frequently desired even in summer time while taking a bath. If it is desired by providing the spout with a valve, as at 36, and keeping the same closed, the device may be used as a heater, the water retained in the coils preventing them from being burned out.

From the above description it will be apparent that we have produced a water-heater which embodies the features of advantage enumerated as desirable in the statement of invention, and while we have shown and described the preferred embodiment of the same it is to be understood that it is susceptible of modification in some particulars without departing from the spirit and scope or sacrificing any of the advantages of the invention.

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

1. A water-heater comprising a conical casing, a burner within the casing near its lower end, a group of heating-coils above the burner and within the casing and approximately parallel with its walls, said coils being adapted to receive water at one end and provided with a spout at the other projecting through the casing, pipes connecting said coils in series including an upright pipe disposed centrally within the group, and outwardly and upwardly flaring deflectors mounted upon said pipe.

2. A water-heater comprising a casing, a burner therein, a conical combustion-chamber in the first-named casing and upon the burner, a group of connected conical heating-coils all supported upon the burner within the combustion-chamber and having one end arranged to receive water and the other to discharge it externally of the casing, the innermost coil being the shortest and each outer coil rising successively higher, a large cup-shaped deflector supported within and at about the center of the height of the inner coil, and a similar cup-shaped deflector supported within and at about the upper end of this coil.

3. A water-heater comprising a conical casing, a burner within the base of said casing and provided with a circular series of jet-orifices, a combustion-chamber cone within the casing and upon the burner and surrounding said orifices at its lower end, a lining within the combustion-chamber, a heating-coil group consisting of an inner, an outer, and a central coil, the lower end of the inner coil extending out through the casing and having its upper end connected to the upper end of the central coil, the lower end of the central coil connected to the upper end of the outer coil by a centrally-disposed pipe, and the lower end of the outer coil projecting out through the casing and terminating in a spout, and a deflector supported upon said centrally-disposed pipe at a point within the group and above said burner.

In testimony whereof we affix our signatures in the presence of two witnesses.

WILLIAM F. CUSHMAN.  
LOUIS O. EVANS.  
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Witnesses:

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