

No. 717,492.

Patented Dec. 30, 1902.

J. F. YOHO.
WATER HEATER.

(Application filed Feb. 21, 1902.)

(No Model.)

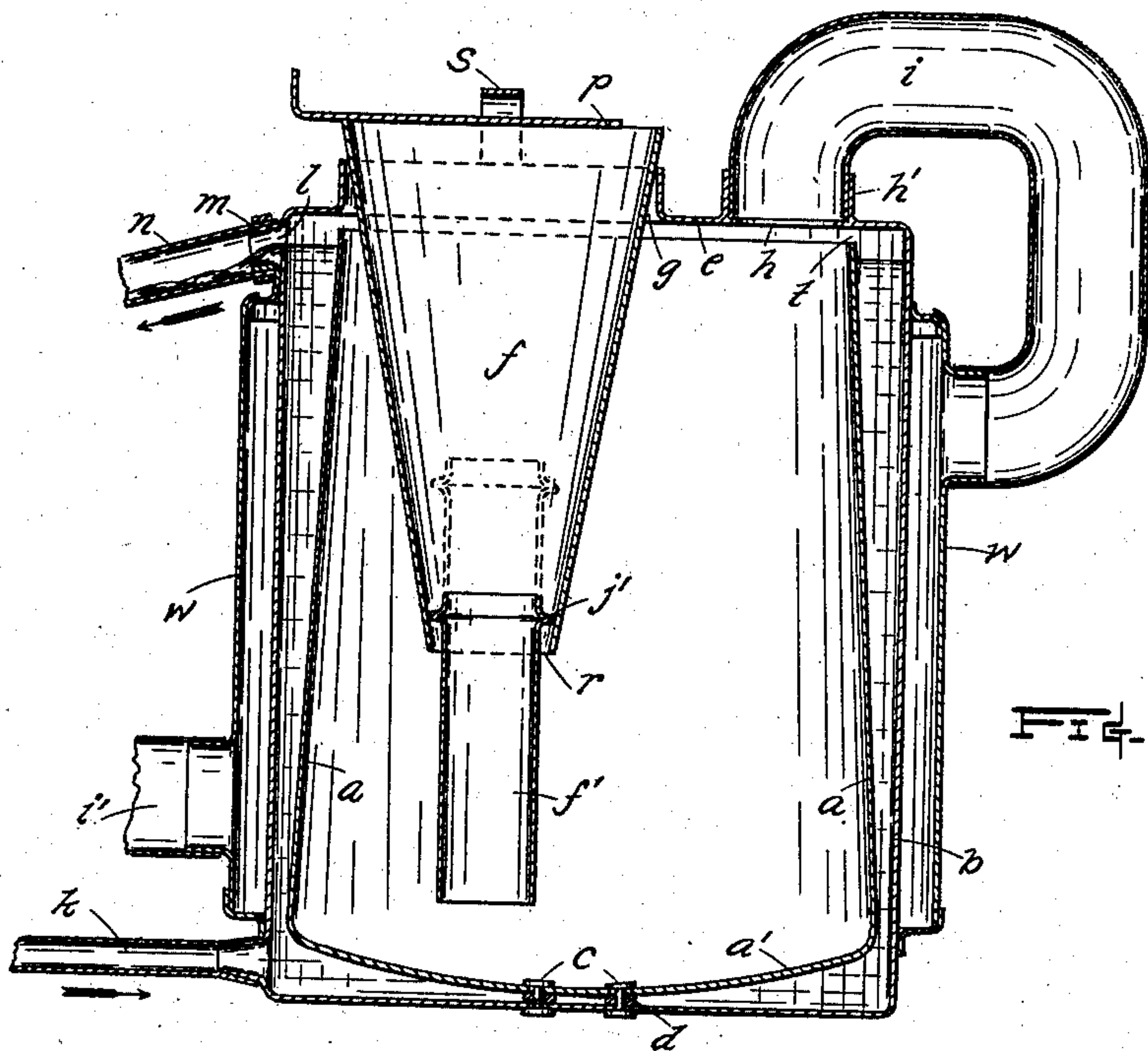


FIG. 1.

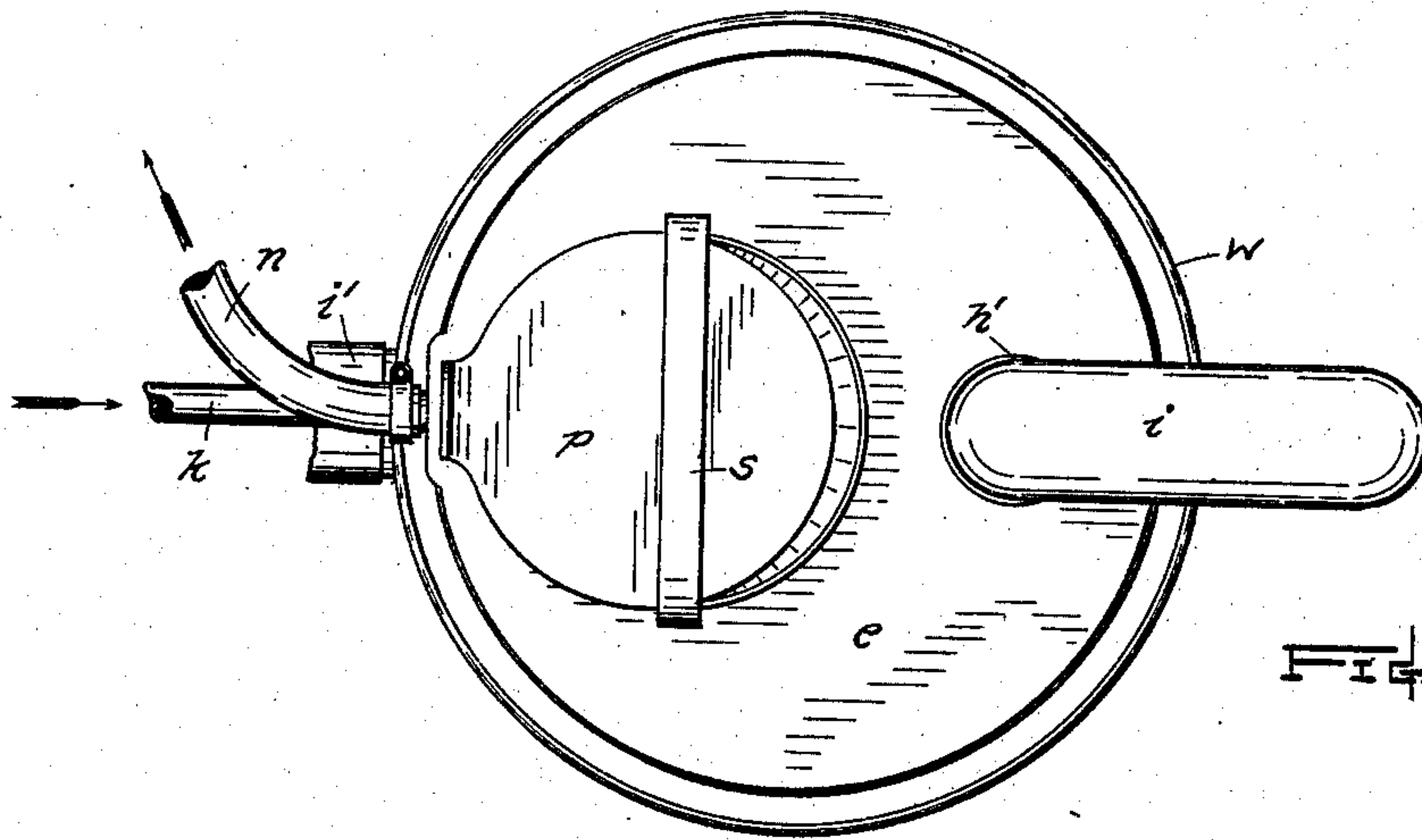


FIG. 2.

WITNESSES:

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WATER-HEATER.

SPECIFICATION forming part of Letters Patent No. 717,492, dated December 30, 1902.

Application filed February 21, 1902. Serial No. 95,030. (No model.)

To all whom it may concern:

Be it known that I, JOHN F. YOHO, a citizen of the United States, residing at Seattle, in the county of King and State of Washington, have invented certain new and useful Improvements in Water-Heaters, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to water-heaters, and particularly to that class adapted to heating water for bath purposes.

It has for its object the provision of a device whereby a large body of water is raised to a relatively high temperature with but a small consumption of fuel.

To these ends the invention consists, first, in constructing the heater of an internal inverted-funnel-shaped combustion-chamber, surrounded by a concentric water-chamber, whereby the water is advantageously disposed for quick heating; secondly, by the provision of a telescopic self-adjustable draft-pipe for admitting air in proximity to the combustibles, and, lastly, in details of construction and combination of the various parts, all of which I will now proceed to describe.

In the accompanying drawings, Figure 1 is a vertical central section of a heater embodying my improvements, and Fig. 2 is a plan view of the same.

In said drawings letters *a* and *b* represent, respectively, the inner and outer shells of the water-heater proper. The outer shell *b* is cylindrical and the inner one *a* tapers upwardly from a dished bottom *a'*, forming a frustum-shaped fire-box therein. The two aforesaid sections are secured to each other through their bottoms by rivets *c*, and distance-pieces or washers *d* are used to prevent their surfaces coming into contact, and thus provide a water-jacket therebetween having a sloping top, from which the steam generated thereat freely escapes in radial directions to mingle with the concentric column of water between the two aforesaid shells. A cover *e* extends across the outer shell, leaving, preferably, an opening *t* between the top margin of the inner shell and the said cover. Above the fire-box in the said cover is an opening *g* for the insertion of a draft-flue *f*, and another opening *h*, having a flange *h'* thereabout in which is

socketed the smoke-pipe *i*, connecting the fire-box *a* directly to a chimney, or, as shown in the drawings, to a belt-casing *w*, concentric of the outer shell *b*, and from thence the smoke is exhausted through pipe *i'*, preferably positioned adjacent to the bottom of the said casing. The said draft-flue is in two parts, the upper one, *f*, being funnel-shaped—that is, it tapers from the top toward the bottom—the top diameter being greater than the diameter of the said cover-opening *g*, thus preventing the same dropping entirely therethrough, my intention being to have its lower end extend down within the fire-box about half the depth of the latter. The other flue-piece *f'* is of less diameter than the opening at the smaller end of piece *f*; but in order to prevent its dropping entirely from the upper part I provide a flange or corrugation *j'* in proximity to its top end. The length of the piece *f'* is such that it will reach, when in its lowest or extended position, from a short distance within the main portion *f* to near the bottom of the fire-box and is intended to rest upon the fuel and lower therewith as it is consumed, thereby supplying a draft in proximity to the flame, as well as through the space *r* between the parts of the flue.

k is the water-inlet pipe adjacent to the bottom of the water-compartment, and *l* is an aperture positioned close to the top for the egress of the water from the surface and is preferably made wide and of relatively small depth—say three inches by one-quarter inch, respectively. The water flowing from the said aperture passes through a spout *m*, to which is clamped a tube *n*, preferably flexible, to convey the water therefrom.

The operation of the device is as follows: The draft-flue *f* and its extension *f'* are removed, by means of a bail *s*, for putting the combustible materials in the fire-box and igniting the same. The said flues are then replaced, and a damper-plate *p* across the mouth of the flue regulates the draft. The extension-piece *f'* of the flue meanwhile rests upon and follows the fuel down as it is consumed, admitting air locally to the fire and also through the annular space *r* between the interfitting parts of the draft-flue, which insures a proper supply of air for consuming

gases which may have been driven off from the fuel, thus preventing the escape of the same unconsumed or those explosions common to "air-tight" furnaces having but a bottom draft. The water having previously been admitted to the running-over level or the height of opening *l* is acted upon by the heat conducted through the inner shell and which by its tapering shape readily raises the temperature of the same to a high degree, when the water is freely admitted and is heated as it passes through the device. The tapering of the inner shell is advantageous for quick and economical heating, as the steam generated thereon instead of following and enveloping the shell with a non-conducting film thereof, as it would were it cylindrical, escapes vertically to be absorbed by the water through which it passes.

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

1. In a water-heater, the combination of a cylindrical outer shell provided with bottom and top ends, said shell being provided with inlet and outlet openings, a frustum-shaped inner shell open at the top and having a dished bottom, said dished bottom being secured to the said bottom end of the outer shell, said top end of the outer shell having draft and smoke flue apertures, a two-part draft-flue extending through said draft-aperture downwardly into the inner shell the upper of said parts being funnel-shaped and the lower one

loosely fitted therein, substantially as and for the purposes set forth.

2. The improved water-heater comprising a cylindrical outer shell provided with bottom and top ends, said shell being provided with inlet and outlet openings, a frustum-shaped inner shell having a dished bottom but open at the top, said top end of the outer shell having draft and smoke flue apertures, a two-part draft-flue extending through said draft-aperture downwardly into the inner shell, a belt-casing around the outer shell and provided with smoke inlet and outlet openings, communicative connection between the said smoke-aperture of the said shell-top and the inlet-opening of the belt-casing, substantially as and for the purposes described.

3. In a water-heater, the combination with an outer cylindrical shell having top and bottom ends, said shell being provided with water inlet and outlet openings, said top end of shell having fuel-supply and smoke-flue openings, of an internal fire-box formed of a frustum-shaped shell having a dished bottom, said dished bottom being secured to the said bottom end of the outer shell with a space for water therebetween, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN F. YOHO.

Witnesses:

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JOHN N. PERKINS.