No. 681,697. Patented Sept. 3, 1901.

J. G. HARVEY.

WATER HEATER.

(Application filed Dec. 14, 1900.)

(No Model.)

FIG. 1.

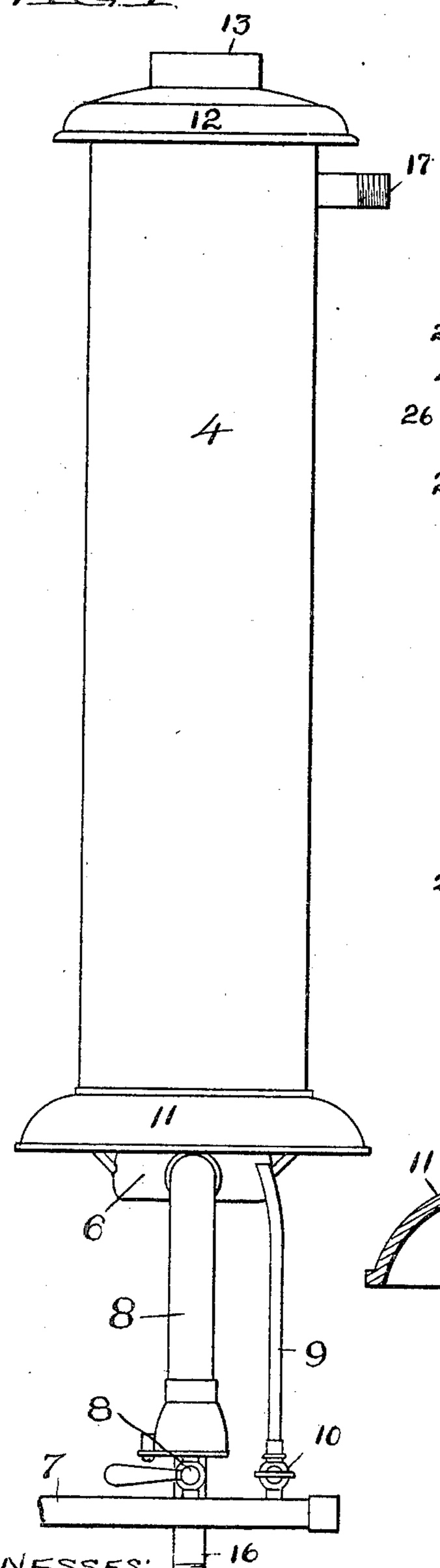


FIG. 2.

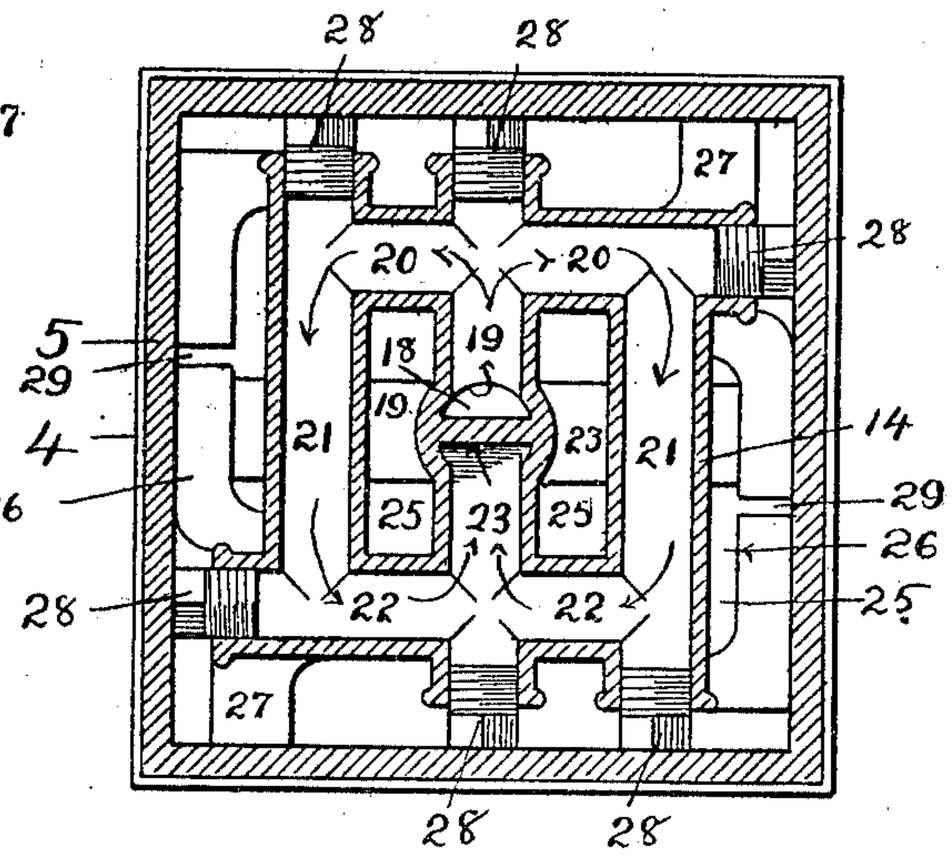
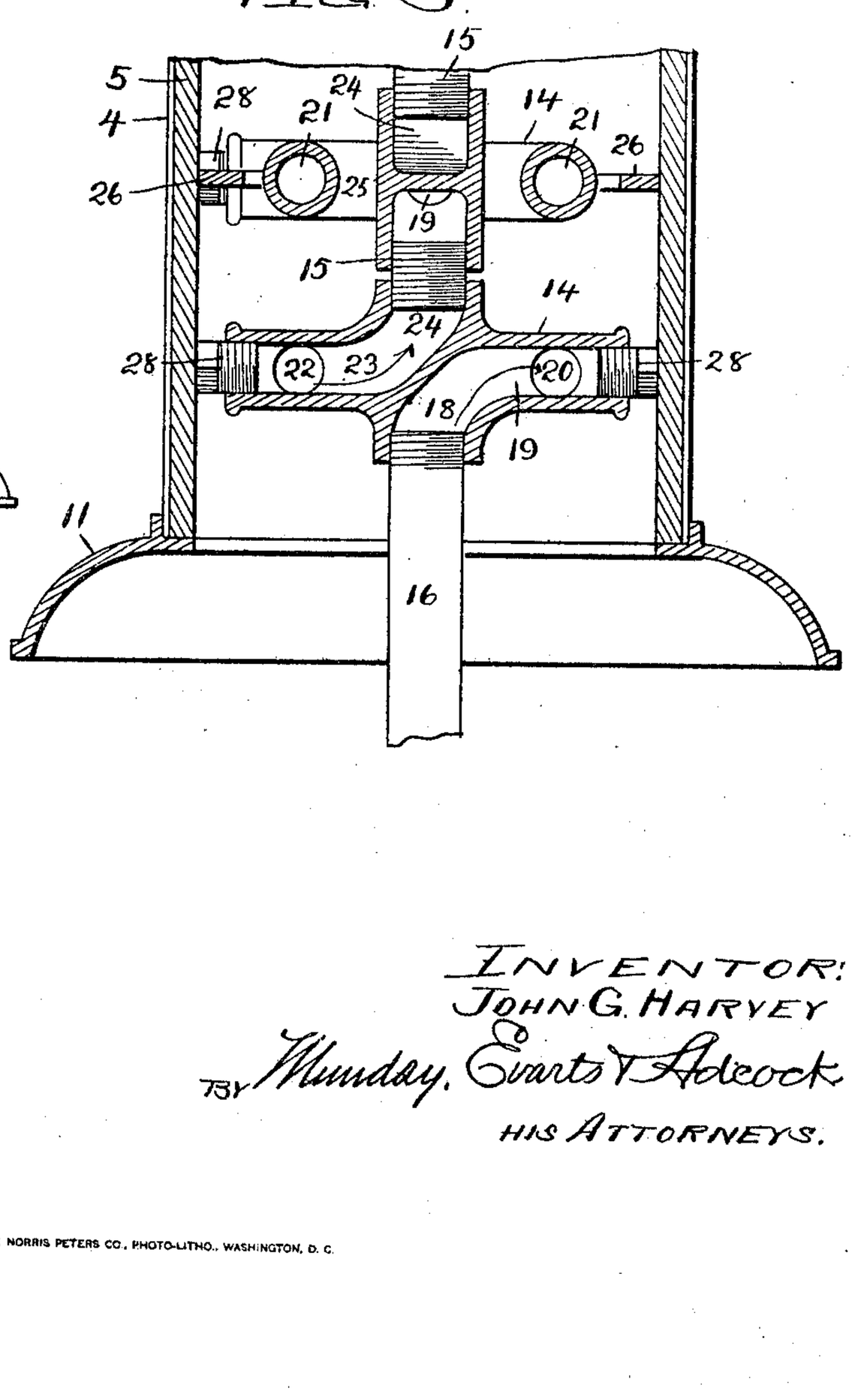


FIG. 3.



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UNITED STATES PATENT OFFICE.

JOHN G. HARVEY, OF CHICAGO, ILLINOIS, ASSIGNOR TO GEORGE M. CLARK & COMPANY, OF SAME PLACE.

WATER-HEATER.

SPECIFICATION forming part of Letters Patent No. 681,697, dated September 3, 1901.

Application filed December 14, 1900. Serial No. 39,839. (No model.)

To all whom it may concern:

Be it known that I, JOHN G. HARVEY, a citizen of the United States, residing in Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Water-Heaters, of which the following is a specification.

This invention relates to the construction of water-heaters for domestic use; and its object is to provide a construction of such heaters which is not only very effective and obtains the best results from the gas consumed, but which is also economical in cost of manufacture.

The invention consists in the novel features of construction hereinafter fully described, and pointed out in the claims.

In the accompanying drawings, forming a part of this specification, Figure 1 is an elevation of my improved heater; Fig. 2, a horizontal and Fig. 3 a partial vertical section, the burner being omitted in the last view.

In said drawings, 4 represents the exterior sheet-metal casing of the heater, and 5 is the asbestos lining whereby the flame and heat-currents are prevented from loss of temperature by radiation.

6 is an ordinary circular gas-burner, receiving its supply of gas from the supply-pipe 7 by means of the mixing or Bunsen tube 8. The burner is controlled by valve 8^0, and a pilot-jet may be furnished it by tube 9, controlled by valve 10. Surrounding the burner is a flaring base-piece 11, and at top is a cap 12, closing the casing at that end, except that provision is made at 13 for a chimney connection to carry off the fumes from the gas. The interior of the casing is filled with a series of cored sections or castings 14, placed one on top of another and coupled together by couplings 15 and forming a continuous but tortuous passage for the water from the supply-pipe 16, which is joined to the bottom of one of the series, to the delivery-pipe 17, which connects with the top one of the series. The construction of these castings will be understood from Figs. 2 and 3. They are all formed with central entrance-passages 18 for the water, and these lead into horizontal passages 19, which extend outwardly from the entrance and branch laterally in both directions, as shown at 20 20, and such branches connect by passages 21 22 and 21 22 with the passage 23, connecting with the central outlet 24. The outlet opens into the coupling 15, whereby the casting is connected to the inlet of the casting next above in the series. The course of the water is clearly shown by the arrows. Between and outside the water-passages of the castings open spaces 25 are left, through which the flame and gases from the burner may pass and by which the latter are compelled to move against the water-holding parts of the casting. The castings are also provided with positioning-flanges 26 and projections 27 at their opposite sides, adapted to set against the lining 5. It is immaterial which side of the sections is placed uppermost, as either can be used for the inlet or for the outlet; but I prefer to arrange them alternately, with the flanges 26 of one casting over the projections 27 of the casting next below, as shown. This alternate order of positioning the sections brings all the water-passages of one section at right angles to the corresponding parts of the next section, so that the heat-currents are caused to strike the bottom surfaces of the passages in all the sections and are rendered very effective in heating the water. At the same time the flanges 26 act as baffle-plates and deflect the heat-currents away from the sides of the casting and into contact with the water-passages. All the passages 19 to 23, inclusive, are made straight instead of curved, as in previous constructions, and 19, 21, and 23 are arranged at right angles to 20 and 22, so as to render the path of the water tortuous, and at one end of each passage is located a screw-plug 28, by removing which the passages are rendered perfectly accessible for cleaning purposes. The sections are also readily detachable from each other. The flanges 26 are separated into parts, as shown at 29, Fig. 2, to permit the expansion thereof under heat without damage to any part of the sections.

The invention gives a very large amount of heating-surface in proportion to the size of the casing.

I claim—

1. The water-heater consisting of a surrounding casing, a burner, and a series of coupled cored sections, each of said sections having both its inlet and its outlet located at

its center, and also having angularly-arranged straight water-heating passages connecting the inlet and outlet, substantially as specified.

2. The water-holding sections for water-heaters consisting of a cored casting having a central inlet and central outlet, and also having angularly-arranged straight water-heating passages connecting the inlet and outlet, substantially as specified.

3. The water-holding section for water-heaters consisting of a cored casting having a central inlet and central outlet, and also having angularly-arranged straight water-heating passages connecting the inlet and outlet, and removable plugs giving access to said passages, substantially as specified.

4. The water-heater, consisting of a casing, a burner and a series of coupled cored sections having water-passages therethrough with central inlets and outlets, and outer baffle-plates, substantially as specified.

5. The water-heater, consisting of a casing, a burner and a series of coupled cored sections having water-passages therethrough with central inlets and outlets, and outer baffle-plates integral with the water-passages, substantially as specified.

JOHN G. HARVEY.

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