

No. 762,541.

PATENTED JUNE 14, 1904.

H. J. LONG.
HEATER FOR HOT WATER SYSTEMS.

APPLICATION FILED MAY 21, 1902.

NO MODEL.

2 SHEETS—SHEET 1.

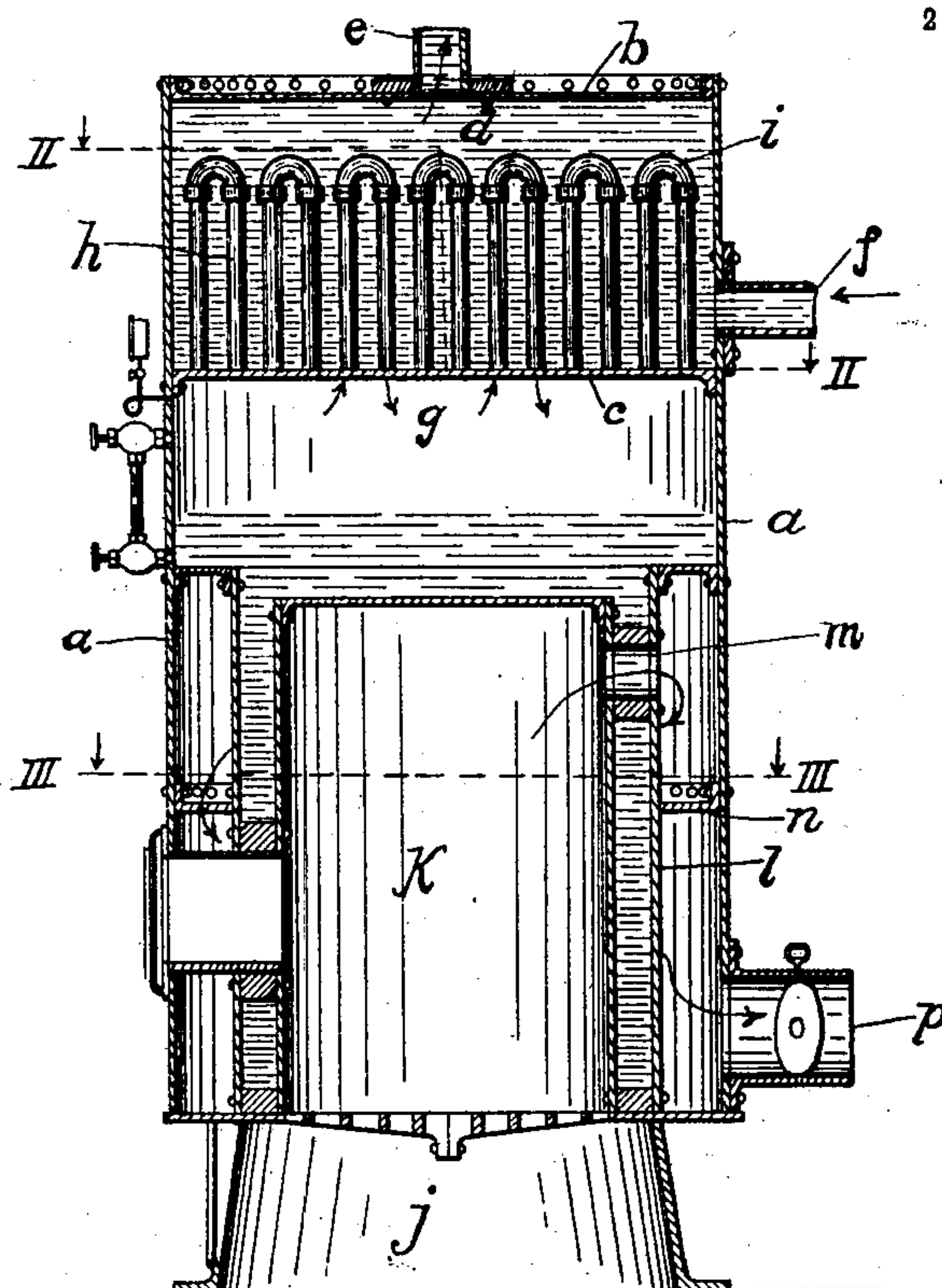


Fig. I.

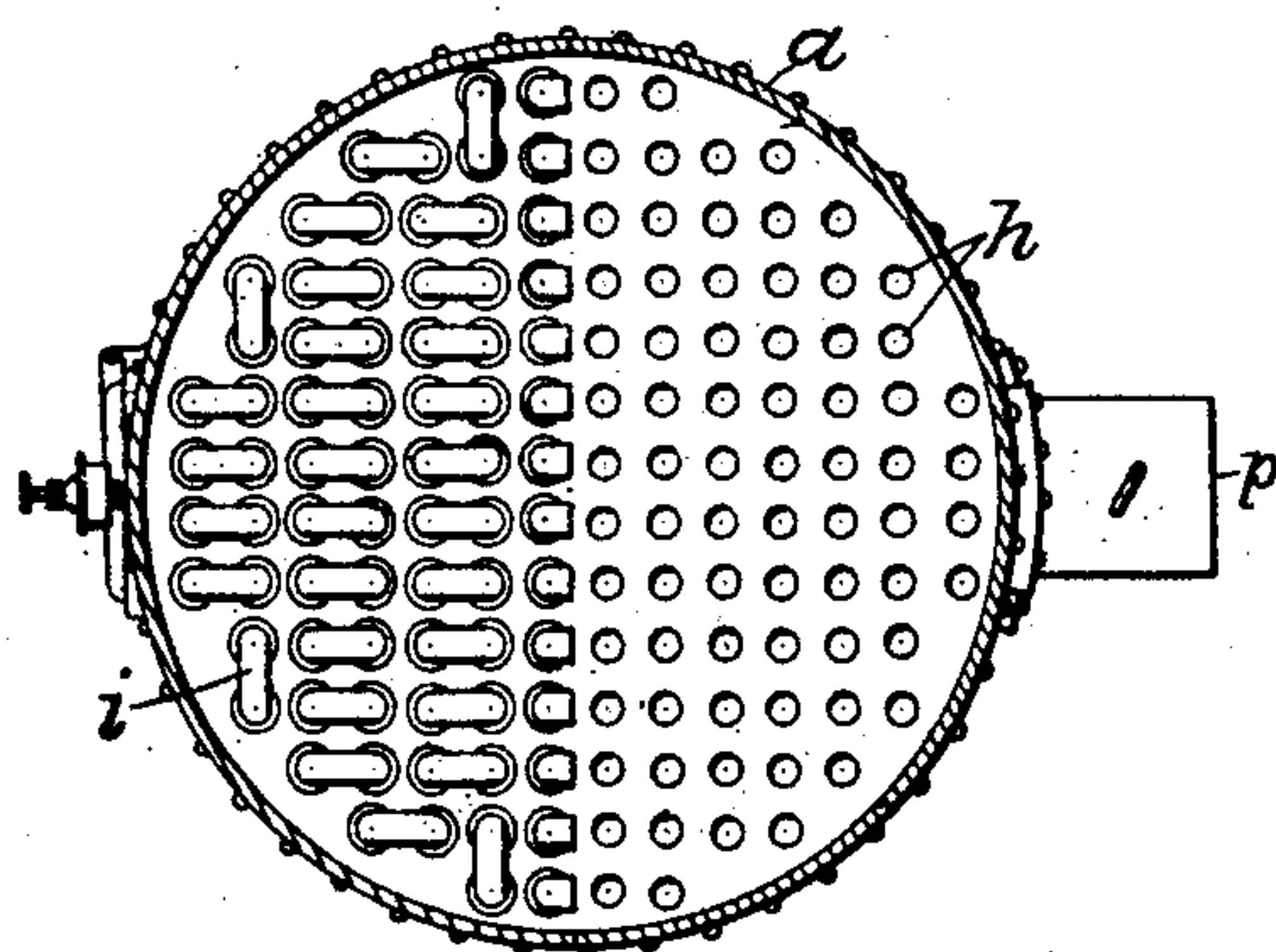


Fig. II.

Witnesses:
Wm. H. Spire
John T. Sullivan

Inventor.
Herbert J. Long.
by Luther H. Hopper,
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2 SHEETS—SHEET 2.

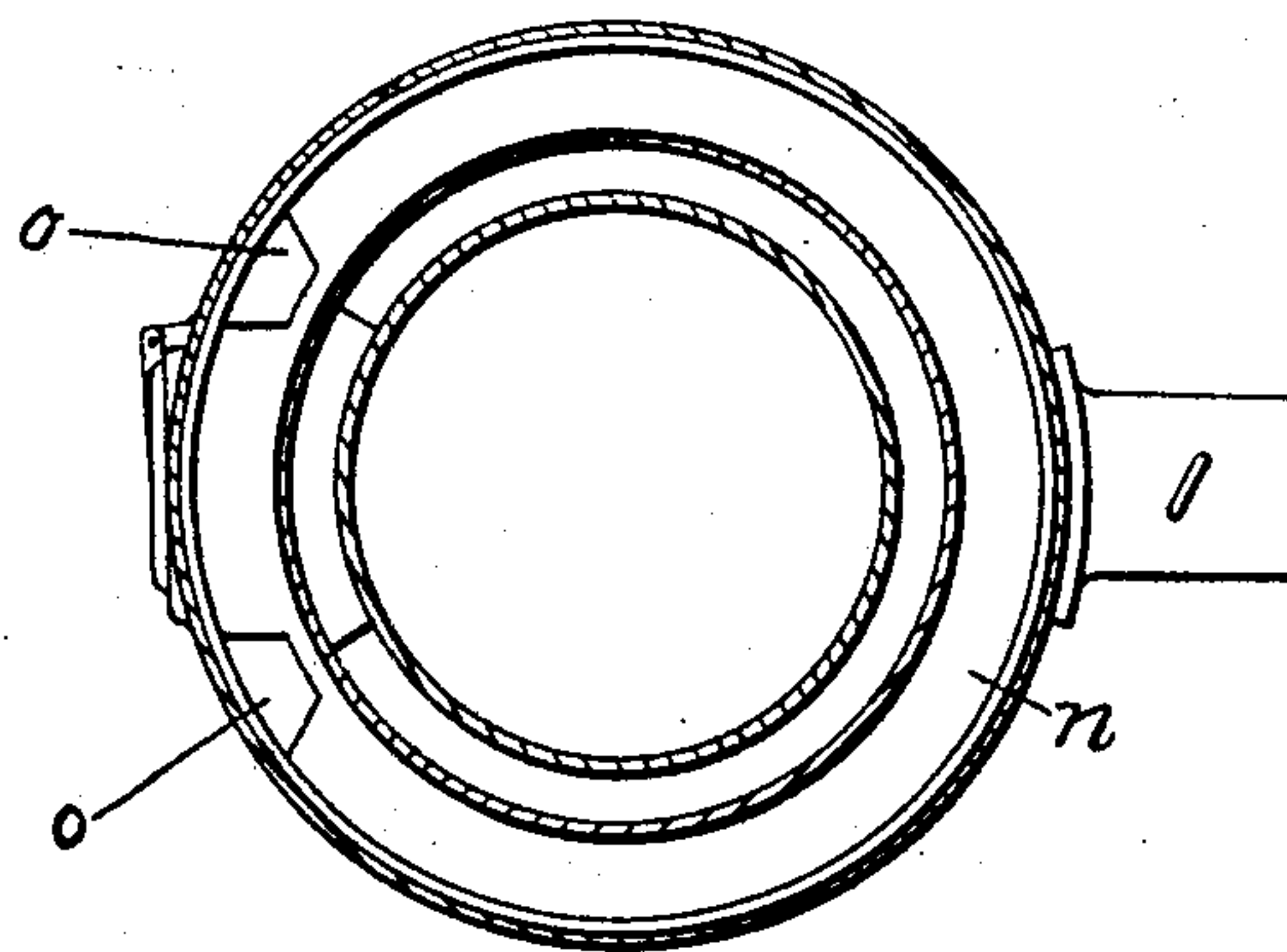


Fig. III.

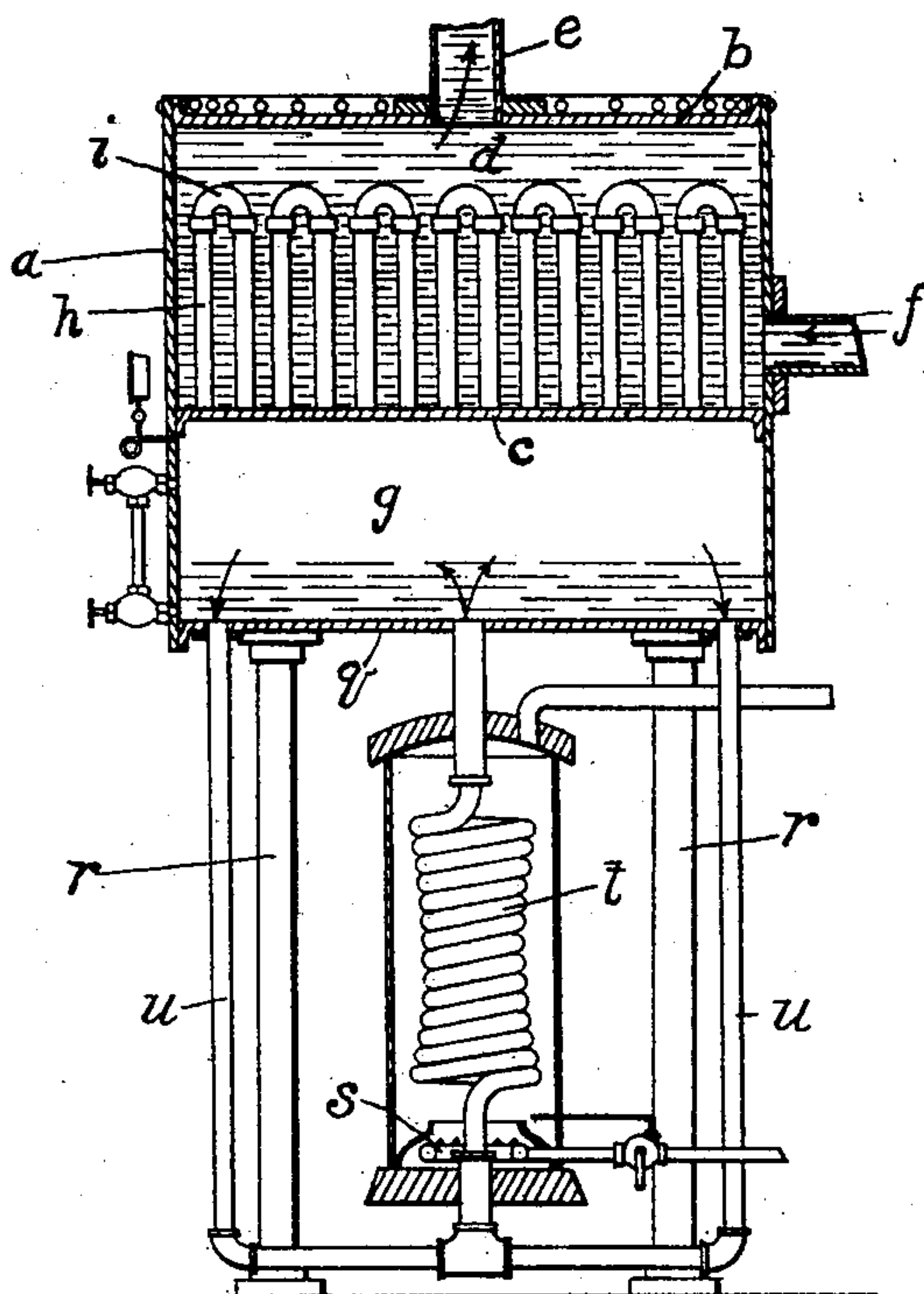


Fig. IV.

Witnesses:
Wm. H. Spire
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UNITED STATES PATENT OFFICE.

HERBERT J. LONG, OF CLEVELAND, OHIO.

HEATER FOR HOT-WATER SYSTEMS.

SPECIFICATION forming part of Letters Patent No. 762,541, dated June 14, 1904.

Application filed May 21, 1902. Serial No. 108,314. (No model.)

To all whom it may concern:

Be it known that I, HERBERT J. LONG, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented new and useful Improvements in Heaters for Hot-Water Systems, of which the following is a specification.

This invention relates to heating apparatus employed in connection with hot-water systems, and is especially adapted to circulating systems used for heating buildings. Its object is to provide an economical, self-contained, and efficient heater for circulating hot-water systems in which the circulating water may be heated by steam tubes and surfaces instead of being brought into contact with surfaces heated directly by the fire in the usual way, thereby combining in an isolated heating plant the advantages resulting both from heating rooms by radiation from hot water and from generating heat in the form of steam. Steam can be raised in a boiler of proper construction with a smaller consumption of fuel than is required to produce the absorption of the same amount of heat by a large body of water confined in drums, tubes, &c., and therefore my apparatus by accomplishing first the production of steam from the direct heat of the fire and then providing for the ready absorption of the heat from the steam by the large body of water in the circulating system effects a considerable saving in the quantity of fuel required. The danger and disadvantages resulting from the incrustation of water-tubes and the choking of fire-tubes, as usually employed in heaters for water systems, are also eliminated. Minor objects will become apparent from the description.

To these ends my present invention consists in the arrangements and combinations hereinafter described and claimed, an embodiment thereof being illustrated in the accompanying drawings, in which—

Figure I is a sectional elevation of the heater. Fig. II is a section taken on line II II of Fig. I. Fig. III is a section on line III III of Fig. I. Fig. IV is a sectional elevation of the heater arranged for using gaseous fuel.

The reference-letter *a* indicates a cylindrical shell having a top head at *b*, between which and a partition *c* is formed a compartment *d*, in which the circulating water is heated. A flow-pipe *e* connects the heating or other water system with the compartment *d* through an aperture in the top head, and a return-water pipe from said system enters the side of said compartment at *f*. The shell *a* below the compartment *d* is arranged as a steam-boiler, having a steam-space at *g* adjacent to the under side of the plate *c*. Communicating with the steam-space *g* and extending up into the water-compartment *d* is a nest of steam-tubes *h*, which are preferably arranged in pairs, the tubes of each pair being connected at their upper ends by return-bends *i*, as shown.

The lower part of the heater may be arranged for burning either solid or gaseous fuel. In Fig. I, which illustrates a coal-burning heater, the shell *a* is supported upon a suitable ash-pit *j*, and a cylindrical furnace *k* is secured inside thereof. Another shell *l*, opening at its upper end into the steam-drum *g*, surrounds the furnace *k*, thus forming an annular water-leg between *k* and *l* and an annular space between *l* and the outer shell *a*. The gases of combustion pass out of the furnace through the flue *m* into the upper rear part of the outer annular space, from whence they are deflected around to the front by the plate *n* and descend through apertures *o* in said plate to the lower part of said space, from whence they are drawn off at the rear by the smoke-pipe *p*.

In arranging the device for generating steam with gaseous fuel I prefer to construct the lower part as shown in Fig. IV, in which the shell *a* is provided with a lower head *q* and supported upon stanchions, such as *r*. A suitable gas-burner *s* is set thereunder, through which passes a water-pipe formed into a coil *t* above said burner, both burner and coil being inclosed in a suitable casing. The upper end of said coil is connected with the steam-drum *g*, and the lower end is supplied with water by pipes *u*, which are also connected with the steam-drum, all as plainly shown in Fig. IV.

Various modifications may be made in the arrangement of the lower or fuel-burning part of the apparatus provided efficient and economical means are employed for raising
5 steam in the drum *g* and provided the principles of construction set forth, respectively, in the following claim are employed.

I therefore particularly point out and distinctly claim as my invention—

10 In a heater for hot-water systems, the combination of a boiler-shell, a partition near its upper portion dividing said shell into a water-compartment above said partition and a steam-space below said partition, a plurality of ver-
15 tical tubes opening into said steam-space and

projecting upward into said water-compartment and connected in pairs at their upper ends by return-bends, said water-compartment being provided with an outlet adapted to communicate with a water-circulating sys- 20 stem, and with an inlet adapted to return water from said system to said water-compartment, substantially as set forth.

In testimony whereof I affix my signature, in the presence of two subscribing witnesses, at 25 Cleveland, Ohio, May 12, 1902.

HERBERT J. LONG.

Witnesses:

JOHN T. SULLIVAN,
J. F. STRAUSS.