No. 827,379. PATENTED JULY 31, 1906.

A. M. LOUDON & F. L. HOGG.

HEATER.

APPLICATION FILED SEPT. 6, 1905.

2 SHEETS—SHEET 1.

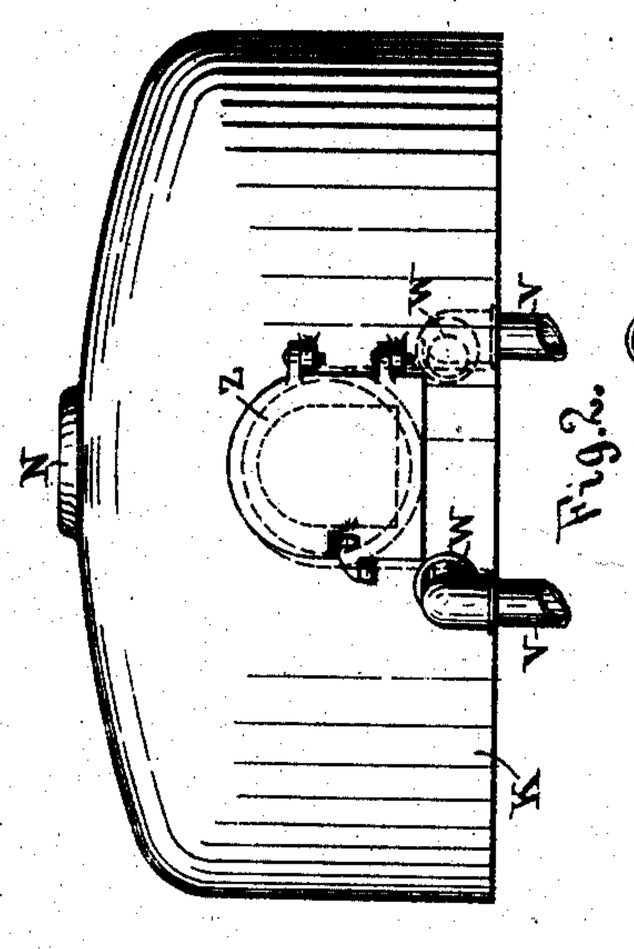

Fig. 2.

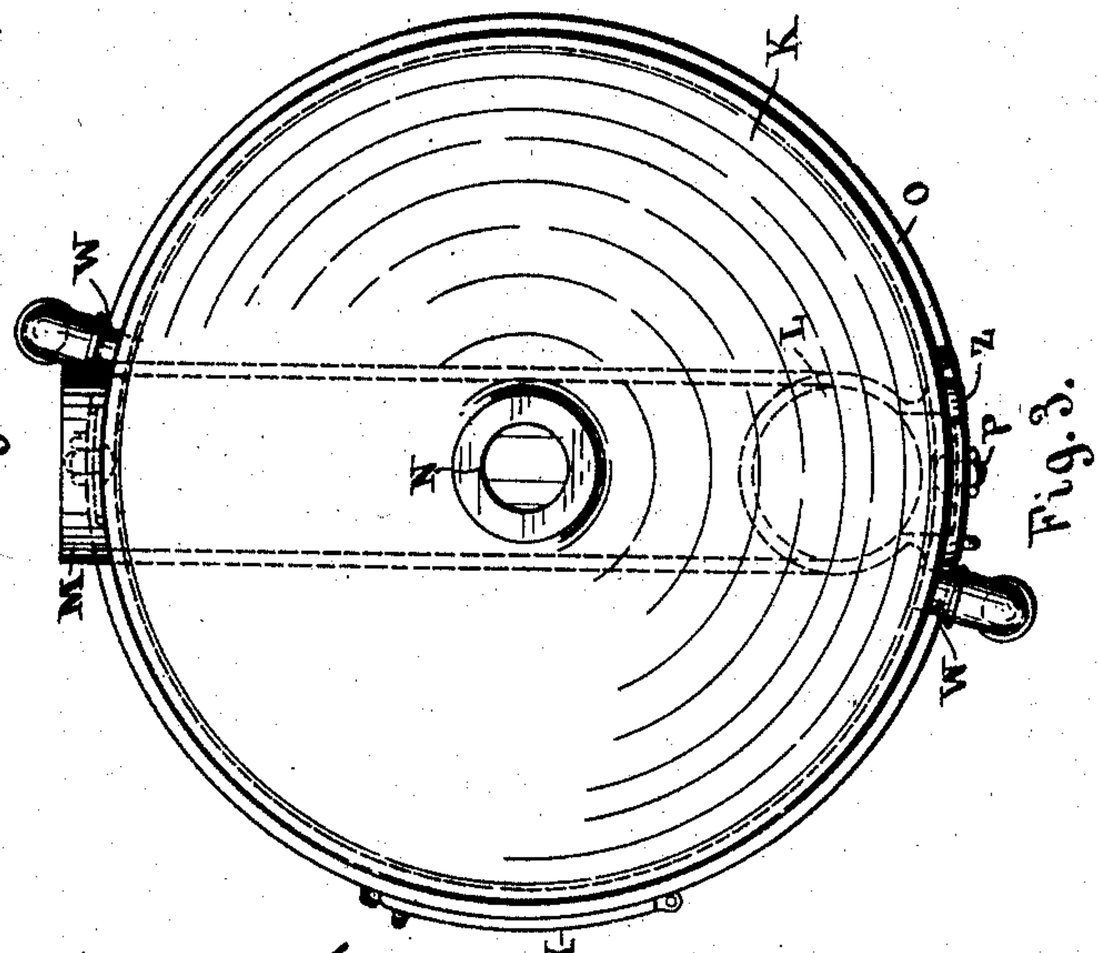

Fig. 3.

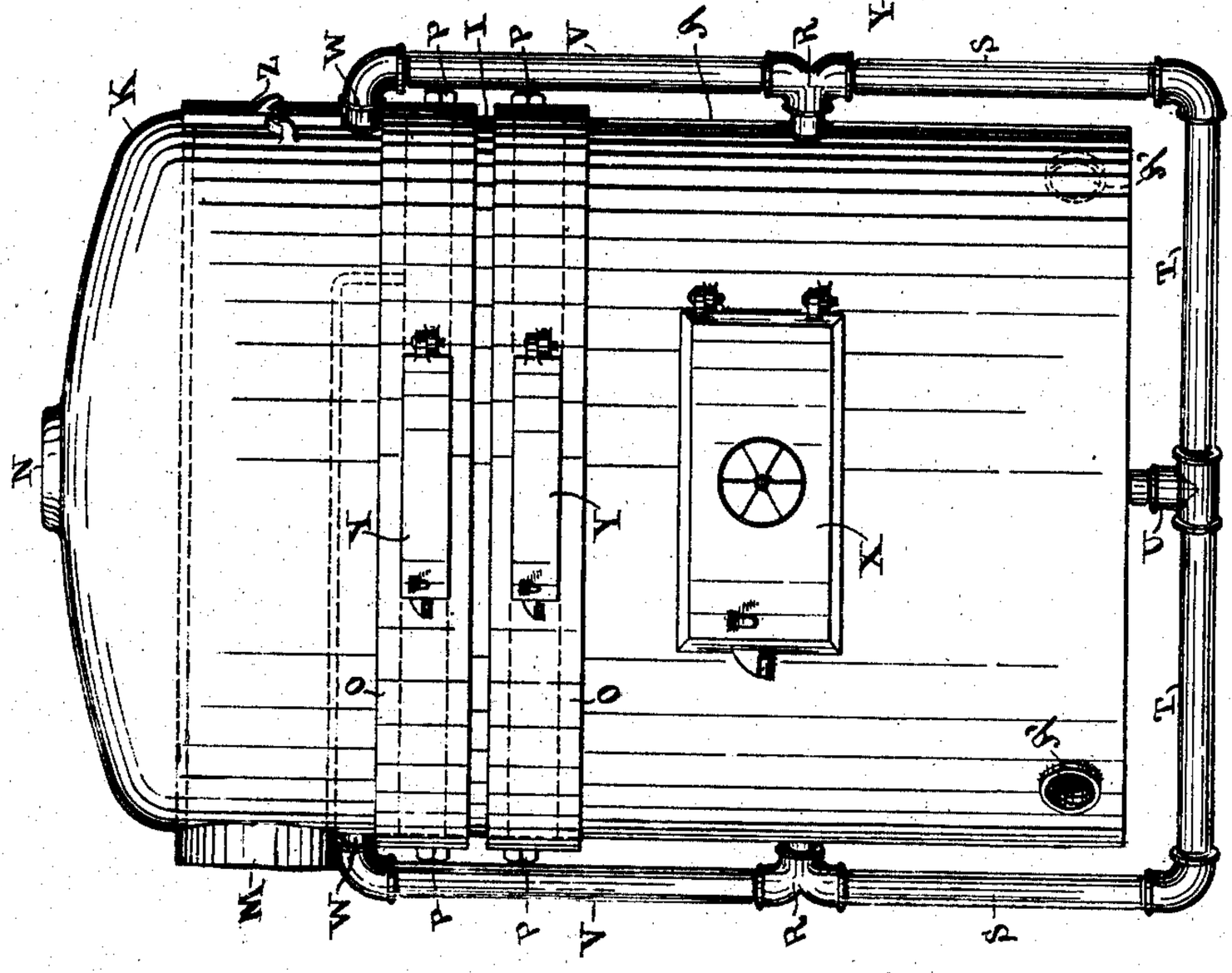

Fig. 1.

WITNESSES

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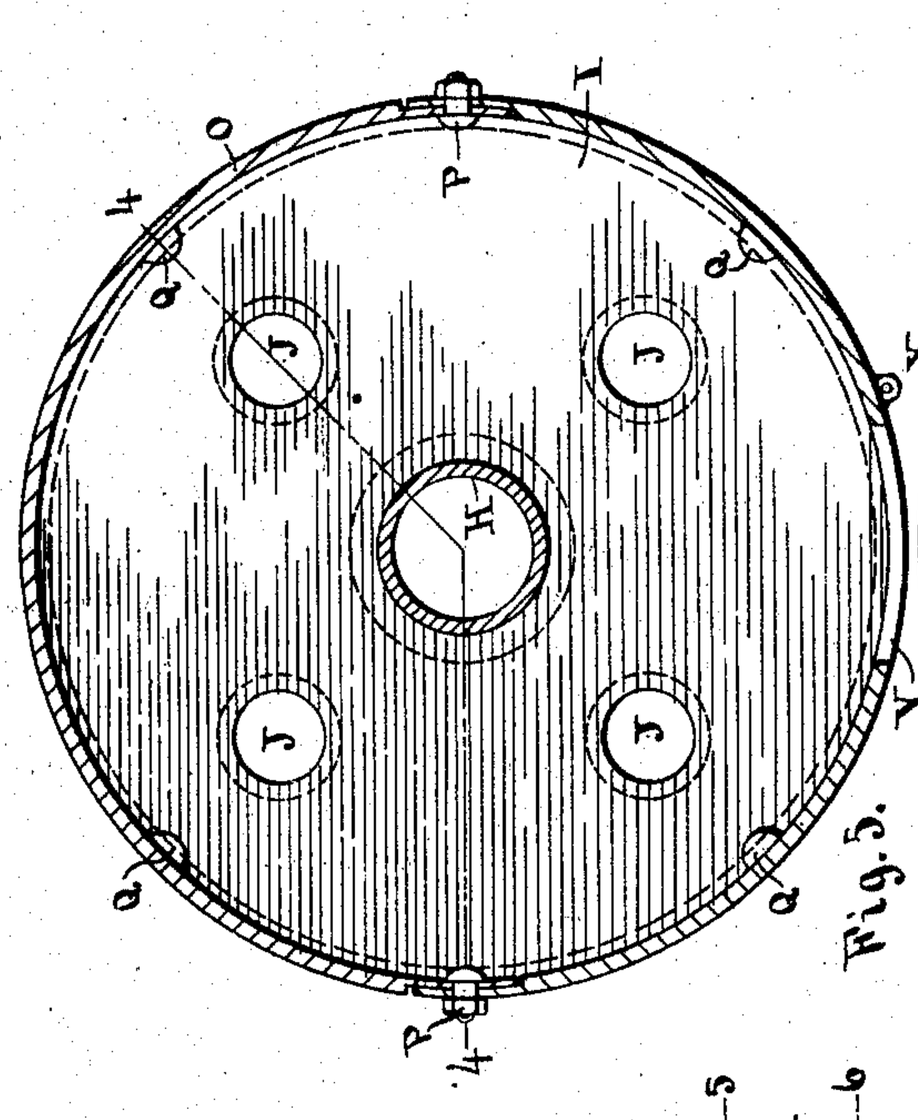

Fig. 5.

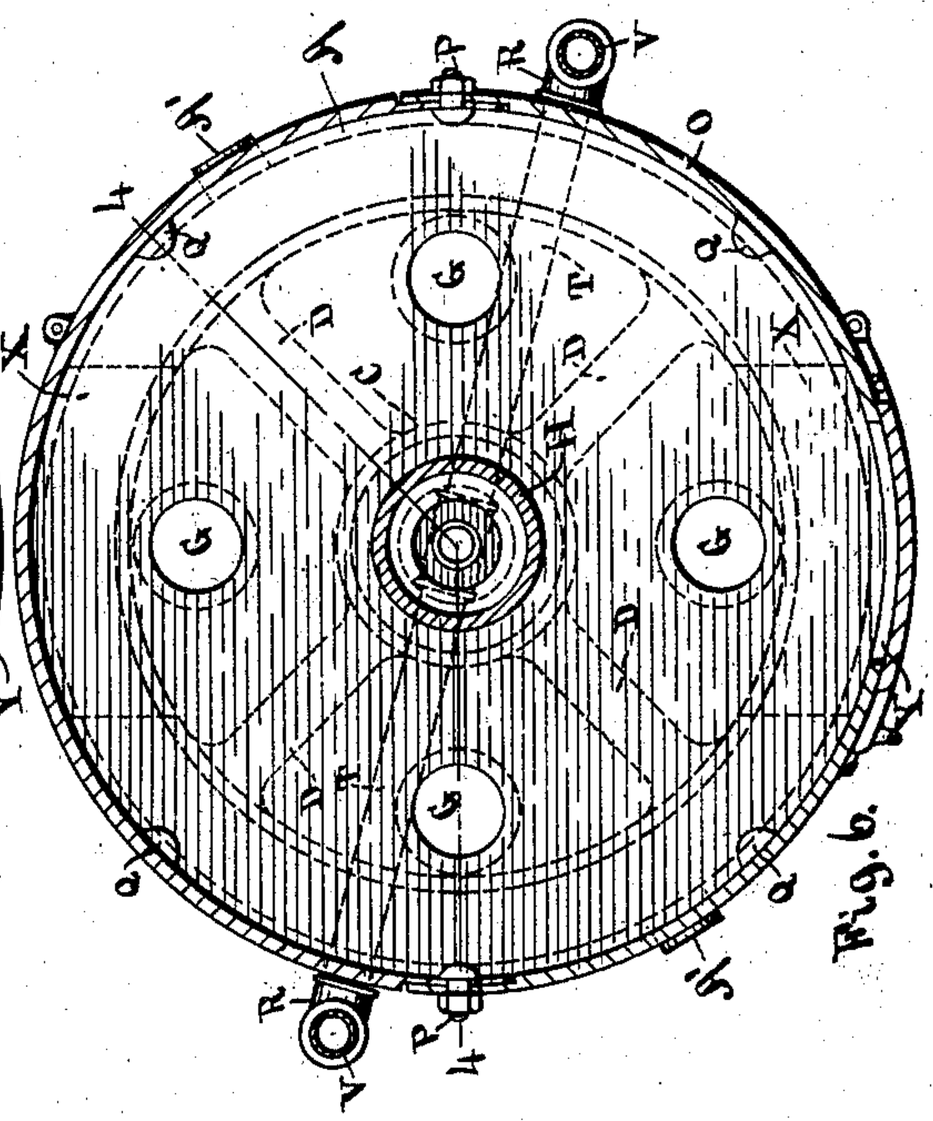

Fig. 6.

Fig. 4.

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UNITED STATES PATENT OFFICE.

ARCHIBALD M. LOUDON AND FREDERICK L. HOGG, OF ELMIRA, NEW YORK.

HEATER.

No. 827,379. Specification of Letters Patent. Patented July 31, 1906

Application filed September 6, 1905. Serial No. 277,143.

To all whom it may concern:

Be it known that we, ARCHIBALD M. LOUDON and FREDERICK L. HOGG, citizens of the United States, residing at Elmira, in the county of Chemung and State of New York, have invented certain new and useful Improvements in Heaters, of which the following is a specification.

This invention relates to improvements in steam and hot-water heaters adapted for house-heatingsy stems; and one object of our improvements is to provide means for utilizing to a greater extent than heretofore the heat at the center of the fire-box for heating the water by providing a central water-chamber which shall be in direct contact with the fire in the fire-box, thereby increasing the heating-surface and circulating effect in any given size of heater and materially increasing the efficiency thereof.

A further object is to so arrange the parts of the heater that the circulation of the gases of combustion as they pass from the fire-box to the smoke-pipe will be such that the greatest possible amount of heat will be extracted therefrom before the gases are permitted to escape from the heater without retarding the flows of the gases through the heater.

We attain these objects by arranging the several parts of the heater in the manner illustrated in the accompanying drawings, in which—

Figure 1 represents a front elevation of our improved heater; Fig. 2, a rear elevation of the dome or top section of the heater; Fig. 3, a plan view of the heater; Fig. 4, a vertical sectional view of the heater on the lines 4 4 in Figs. 5 and 6; and Figs. 5 and 6 horizontal sections on the lines 5 5 and 6 6, respectively, in Fig. 4.

Like reference-letters indicate like parts in the several views.

The heater, as herein illustrated, consists of three sections placed one above the other. Of these three sections the larger section A constitutes the main section and rests upon a suitable ash-box or base. (Not shown.) The heater is preferably of cylindrical form, and the main section A comprises an outer annular chamber or leg B and a central water-chamber C, the space between the water-chambers B and C constituting the fire-box, for which a suitable grate E is provided at the bottom of the section. The central water-chamber C is preferably conical in form, increasing in diameter as it rises toward the longitudinal top water-space F, by which the central and outer water-chambers are connected at the top of the section. The central water-chamber is further connected to the outer water chamber or leg B by means of a series of hollow ribs or wings D, whereby additional heating-surface is provided and whereby also a more rapid and free circulation from the central water-space to the outer water-space is insured. These wings also serve to strengthen and brace the shell of this central chamber. Between the wings D vertical flues G pass through the upper water-space F to permit the gases of combustion to rise into the upper flues of the heater.

Above the main heater-section we provide one or more disk-shaped intermediate sections I, which are coupled to the main section by means of large cast-iron nipples H at the center, space being allowed between sections to permit of a proper circulation of gases therebetween. The intermediate section is provided with flues J for the passage of the gases therethrough, said flues being staggered with reference to the flues G, so as to cause the gases to take an indirect course as they ascend between sections. Above the intermediate section is a top section or dome J, coupled thereto by a large central cast-iron nipple H. This dome-section is provided at one side with a vertical flue L, which connects with a horizontal flue M, which passes from one side of the dome to the other and is completely surrounded by the water and steam contained in the dome. This horizontal flue connects with the smoke-pipe, and from it the gases of combustion are carried away from the heater. The steam or hot water in the heater passes out to the circulating system at the top of the dome through a suitable pipe connection at N, the return being effected by suitable pipe connections to the water-leg at points A′. Fresh water will also be admitted to the heater by way of the water-leg.

The horizontal flue-spaces between sections are closed by means of sectional cast-iron rings O, which are fitted together by lap-joints and bolted in place, as indicated at P, after the sections are assembled, suitable packing being provided where the rings engage the section sides to make a smoke-tight

joint. These rings are provided with inwardly-projecting lugs Q, which rest upon the lower sections to properly support and position the rings with reference to the sections.

To provide for the proper circulation of the water from the central water-space which receives the greatest heat to the outer water space or leg of the heater, we connect the leg at R by way of the pipes S and T and the T connection U to the bottom of the central water-chamber, there being preferably two of these connections set at diametrically opposite points. We further provide for a circulation from the top or dome to the leg of the heater by means of the connections W and the pipes V, leading into the connections R. To insure the proper circulation from the dome to the leg and from the leg to the central water-chamber, we make the connection R in the form of a two-way T, as indicated in the drawings. The fire-box is fed by way of suitable openings at X, two of these openings being provided at diametrically opposite points in order that the coal may be properly distributed around the fire-box. The rings O are provided with clean-out openings at Y, and the smoke-flue is provided at the rear with a clean-out opening at Z. All of said openings are closed by doors in the usual manner. By this arrangement of the heater it will be seen that we provide for utilizing the heat at the center of the fire-box, where the fire is usually the hottest, for heating a water-chamber in direct contact therewith, and that we further so arrange the parts of the heater that the heat from the gases of combustion as they pass through the heater will be utilized to the greatest possible extent for water-heating purposes. Where our heater is used for steam-heating purposes, the horizontal flue in the dome will act as a superheater for the steam contained in the top of the dome, thereby insuring a circulation of dry steam to the heating system.

Having thus described our improved heater, what we claim as our invention, and desire to secure by Letters Patent, is—

1. A heater-section comprising an outer water-chamber, a fire-box inclosed thereby, a central water-chamber surrounded by the fire-box, a horizontal chamber or water-space provided with vertical flue-openings uniting the central chamber with the outer chamber at the top, all of said parts being formed in one casting, and a connection between the outer chamber and the bottom of the central chamber.

2. A heater-section comprising an outer water-chamber, a fire-box inclosed thereby, a central water-chamber surrounded by the fire-box, a horizontal chamber or water-space provided with vertical flue-openings uniting the central chamber with the outer chamber at the top, said central chamber increasing in diameter from the bottom upward, and a connection between the outer chamber and the bottom of the central chamber.

3. A heater-section comprising an outer water-chamber, a fire-box inclosed thereby, a central water-chamber surrounded by the fire-box, a horizontal chamber or water-space uniting the central chamber with the outer chamber at the top, a plurality of hollow ribs or wings extending from the central chamber to the outer chamber and connected at the top with the horizontal chamber, flue-openings in the horizontal chamber between said wings, and a connection between the bottom of the central chamber and the outer chamber.

4. A heater comprising a bottom section consisting of an outer water-chamber, a fire-box inclosed thereby, a central water-chamber surrounded by the fire-box, a horizontal chamber or water-space uniting the central chamber with the outer chamber at the top, one or more intermediate sections each consisting of a disk-shaped water-chamber coupled at the center to the horizontal chamber of the first section, and a top or dome section coupled at the center to the underlying intermediate section, said sections being spaced apart and provided with staggered vertical flues for the discharge of the gases of combustion, the dome being provided with one vertical flue positioned at one side thereof and communicating with a horizontal flue which passes through the dome to the opposite side, where it connects with the smoke-pipe, and a circulating connection extending from the bottom of the central chamber to the outer chamber of the first section and to the dome-section.

5. A heater comprising a bottom section consisting of an outer water-chamber, a fire-box inclosed thereby, a central water-chamber surrounded by the fire-box and connected at the top and bottom with the outer water-chamber, a top or dome section positioned above and connecting with the first section, flues for the gases of combustion passing through and between the sections, and a circulating connection between the dome and the outer water-chamber of the first section.

6. The combination, with a heater, of a top or dome section having a horizontal flue passing across from one side to the other and surrounded by the water or steam space within the dome, a vertical flue connecting one end of said flue with the flue system of the heater, and means for connecting said horizontal flue at the other end with a smoke-pipe.

In testimony whereof we have affixed our signatures in presence of two witnesses.

ARCHIBALD M. LOUDON.
FREDERICK L. HOGG.

Witnesses:
A. S. DIVEN,
J. H. O'BRIEN.