

No. 736,800.

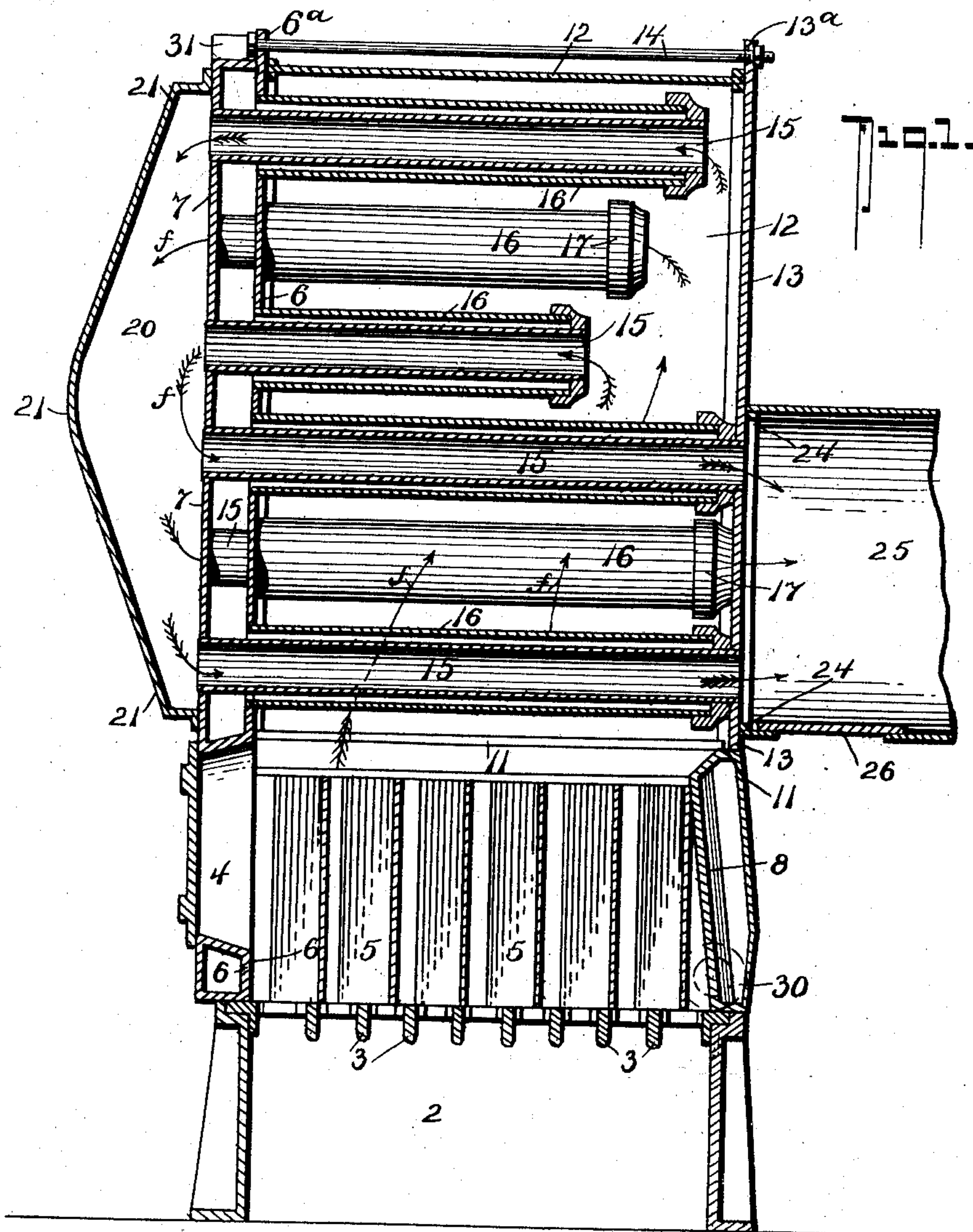
PATENTED AUG. 18, 1903.

W. E. VANSTONE.
WATER HEATER.

APPLICATION FILED JAN. 13, 1903.

NO MODEL.

2 SHEETS—SHEET 1.



WITNESSES:

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John T. Schrott

INVENTOR

W. E. Vanstone

BY

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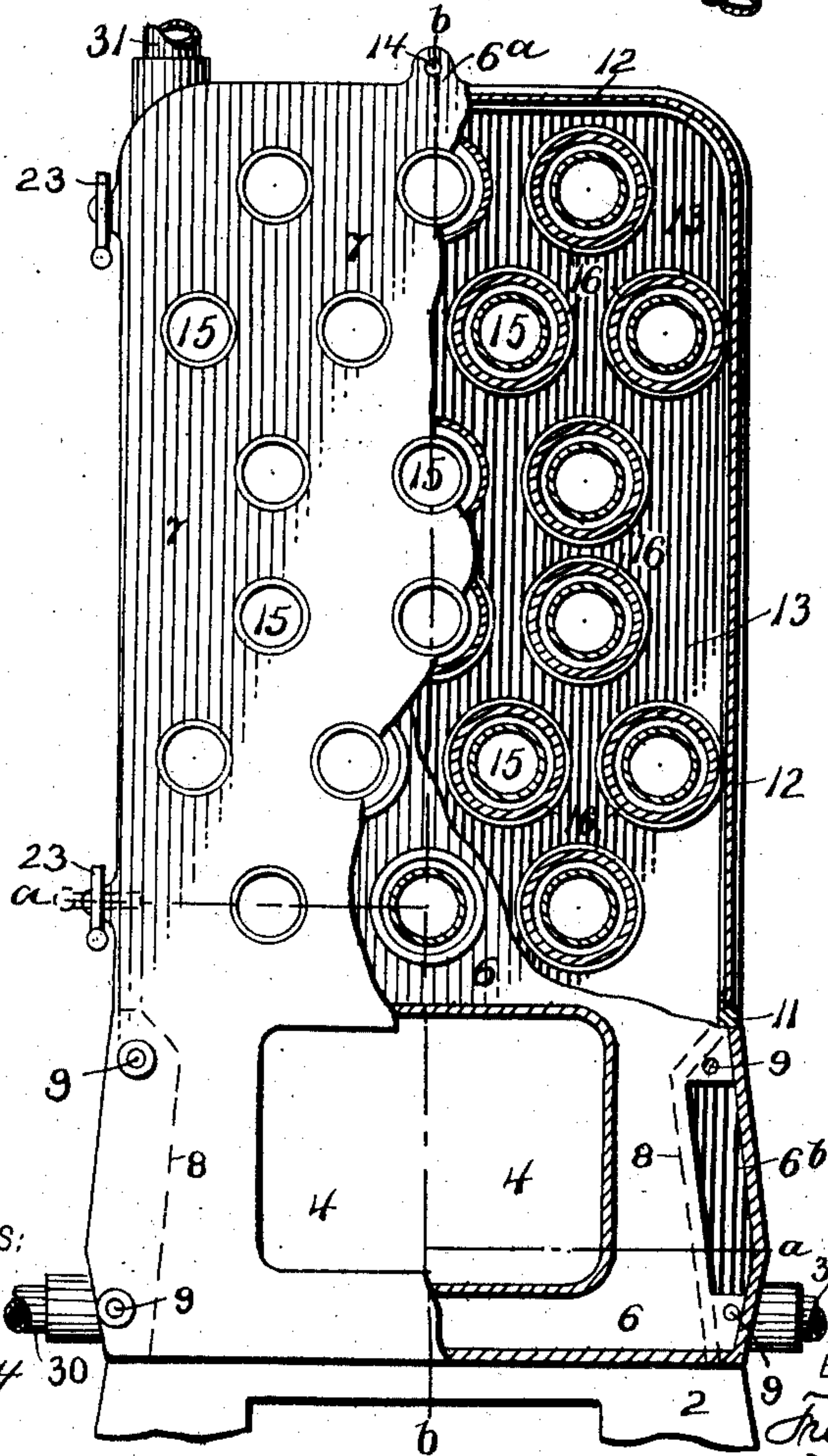
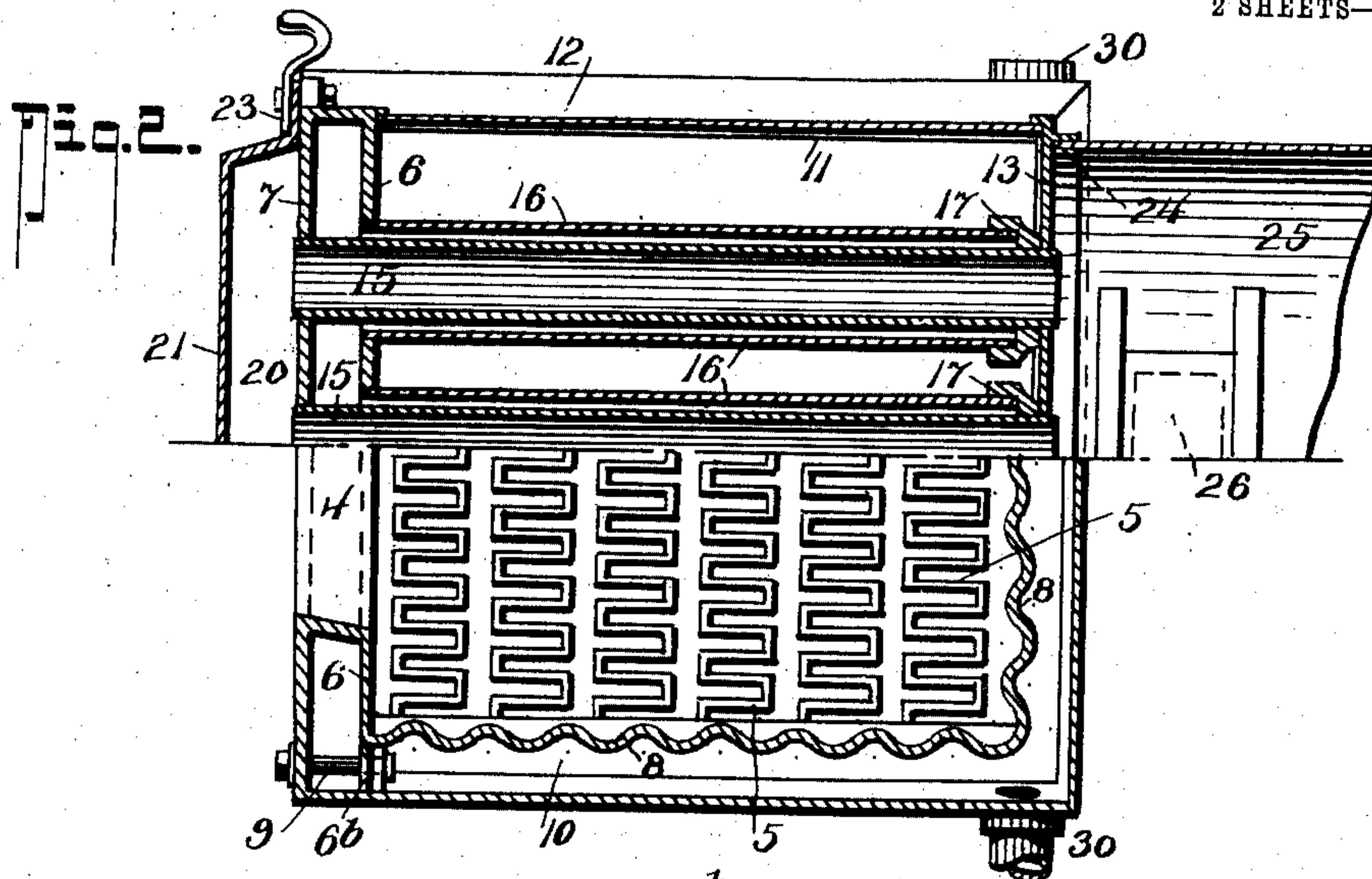
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UNITED STATES PATENT OFFICE.

WESLEY EDGAR VANSTONE, OF NEW WESTMINSTER, CANADA.

WATER-HEATER.

SPECIFICATION forming part of Letters Patent No. 736,800, dated August 18, 1903.

Application filed January 13, 1903. Serial No. 138,842. (No model.)

To all whom it may concern:

Be it known that I, WESLEY EDGAR VANSTONE, a citizen of the Dominion of Canada, residing at New Westminster, in the Province of British Columbia, Canada, have invented a new and useful Water-Heater, of which the following is a specification.

My invention relates to an improved water-heater of that class used for the warming of houses or buildings by the circulation of hot water therethrough; and my object has been to design a heater that shall be self-contained with the fire-box and flue, so as not to require any building in, that shall have an ample water-heating area exposed to the furnace-gases, an efficient circulation of the water through every part and past the hottest fire exposure, and have the flues and heating-surfaces easy of access for cleaning purposes.

The design is a modification of that revealed in my United States Patent No. 704,988, issued the 15th of July, 1902, adapting the system of jacketed flue-tubes to a small self-contained heater suited to the requirements of small installations.

Of the drawings which accompany this specification, Figure 1 is a vertical longitudinal section on the line *b b* in Fig. 3. Fig. 2 is a sectional plan, part through the combustion-chamber and part through the fire-box on the line *a a* in Fig. 3; and Fig. 3, a front end elevation with flue-cover removed and part section.

In the drawings, 2 indicates the ash-chamber, the walls of which form the base or foundation on which the heater stands and in the upper side of which are set the fire-bars 3. Surmounting this ash-chamber is the fire-box 5, the water-jacketed walls 8 of which slope inward toward the top and are corrugated in vertical grooves, so as to expose an ample and efficient area to the heat of the fire and permit of free expansion. The front end of the fire-box is closed by the header, to the bottom lower corners of the inner wall 6 of which the ends of the fire-box are jointed and secured by the bolts or studs 9, suitable openings 6^b in the wall 6 connecting the water-space 10 of the fire-box walls with that of the header. Through the lower part of the

header is the fire-doorway 4, closable with a door in the usual manner. The header is carried above the fire-box and forms the front of the combustion-chamber, the back plate 13 of which is of similar shape and size to that part of the header above the fire-box level and rests in a lipped groove 11 on the back wall of the fire-box. This groove 11 is also carried around both side walls of the fire-box, and in it rest the lower edges of the inclosing plate 12 of the combustion-chamber, the front and back edges of which joint in lipped grooves around the inward faces of the front header and back plate, being drawn up and held together by one or more tie-bolts 14 through projecting lugs 6^a and 13^a. The inner side of the plates 12 and 13 not being water-jacketed may be protected by asbestos board or any suitable non-conducting material.

In suitable apertures in the front or outer wall 7 of the header are secured a series of horizontal flue-tubes 15, which pass through the water-space of the header and project into the combustion-chamber, and surrounding each is a jacket-tube 16, secured in the inner plate 6 of the header, so as to preserve a water-space surrounding the flue-tube and in communication with that of the header. This annular water-space is closed at the end by the reducer 17, adapted to effect a junction between the flue-tube and the inclosing jacket-tube, while leaving the flue-tube open. The tubes in the upper half of the header are shortened to various lengths within the combustion-chamber, so as to efficiently distribute the current of the heated gases which is to flow through them; but in the lower group each flue-tube projects beyond the reducer and passes through the back plate 13, so as to establish connection between front and back of the combustion-chamber while passing through the same. The ends of the upper and lower group of flue-tubes at the front plate 7 of the header are connected by the flue 20, inclosed by the casing 21, the edges of which are jointed on the header front plate 7, and the flue-casing is hinged thereto at one side and secured at the other by the latches 23, designed to engage the edge

flange of the casing. This affords ready access to the tubes and flues for cleaning purposes. The ends of the lower series of flue-tubes where they come through the back plate 13 are surrounded and inclosed by the connection 25, seated on a projecting lip 24 on the back plate, which connection conveys the smoke and products of combustion to the chimney. In its underside is a closable hand-hole 26 for the removal of soot and dust.

The water-inlet to the heater is connected to one or both sides of the fire-box jacket toward the back end, as 30, and the delivery of the water from the heater is made at one or both sides of the top of the front header, as 31.

The course of the furnace-gases is clearly shown by the arrows *f*. As indicated, they flow upward to the exposed ends of the upper series of flue-tubes, passing in their course among the jackets of the lower tubes. On the front face of the header they flow down to the lower series of flue-tubes and pass through them to the chimney connection. It will be seen, therefore, that the water from its point of entry is brought in contact with an efficient heating-surface, while the fire is not liable to be chilled by too close or excessive contact with the water-jackets, as the corrugations of the fire-box break up the contact on the sides and back, while affording an increased area of such a kind as will break up and divert the products of combustion in their progress to the flue-tubes. It will be noticed, further, that the whole construction is exceedingly simple to manufacture and of a class not liable to derangement, while from the ready manner by which the flue-door may be opened and the back plate removed and direct access to the tubes and combustion-chamber be attained the heater may be kept in a high state of efficiency with very little trouble.

Having now particularly described my invention, I declare that what I claim as new, and desire to be protected in by Letters Patent, is—

1. In a water-heater of the class described, having a foundation or base inclosing an ash-chamber and supporting the furnace-bars; a water-jacketed fire-box resting thereon, the water-space of which is connected at the front to that of a hollow header, having in the lower part the furnace-doorway, such header extending upward to form also the front wall of the combustion-chamber; a combustion-chamber above the fire-box suitably connected thereto; a series of water-jacketed flue-tubes, each secured in the front plate of the header and projecting into the combustion-chamber toward the top; a further series of similar jacketed tubes extending through the lower part of the combustion-chamber and through the back plate thereof; a flue connecting the front ends of the upper and lower groups of flue-tubes; a flue connecting the

back ends of the lower group to the chimney; and means whereby water may be admitted to, and withdrawn from, the water-space of the heater.

2. In a water-heater including a fire-grate and a water-jacketed fire-box surrounding same, and a combustion-chamber above the fire-box, said fire-box having inwardly-inclined vertical corrugated walls extending from the fire-grate to the combustion-chamber; a hollow header forming the front of the fire-box and combustion-chamber, horizontally-disposed water-jacketed flues consisting of an inner and an outer tube, and projecting into the combustion-chamber, the inner one of the said tubes being connected to the outer wall of the header and the outer one of said tubes being connected to the inner wall of the header, a smoke-offtake flue, flues passing through the combustion-chamber to the smoke-offtake flue, said last-named flues consisting of inner and outer tubes, said inner tubes being connected to the outer wall of the combustion-chamber and to the back plate of the header and said outer tube being connected to the inner wall of the header, a casing hinged to the outer wall of the header to form a flue for connecting the first-mentioned flue to the flues communicating with the smoke-offtake flue and means for circulating water through the fire-box header and flue-tube jackets, substantially as shown and for the purposes described.

3. In a water-heater as described, having a fire-box and a hollow header forming one end of the combustion-chamber; a series of flue-tubes, projecting into the combustion-chamber, each comprising an inner tube secured in the outer plate of the header, an outer tube secured in the inner plate of the header, so as to leave an interspace in communication with the water-space of the header, means for joining the ends of the pipes so as to close the interspace while leaving the inner tube open for the furnace-gases, and a casing hinged to the outer plate of the header to form a flue for the purposes described.

4. In a heater as described having a header forming the front of the combustion-chamber, and two groups of water-jacketed flue-tubes, the upper of which communicates between the interior of the combustion-chamber and the outer face of the header, and the lower group of which communicates with the front face of the header through the combustion-chamber, to the chimney connection; a removable casing jointed to the front face of the header inclosing a flue-space joining the upper and lower group of tubes.

5. In a heater as described having a jacketed furnace and a hollow header in connection therewith, extending upward to be the front of a combustion-chamber, forming an upward extension of the fire-box; a back plate seated in a lipped groove on the back wall of

the fire-box, and corresponding with the front header; a plate forming the sides and top of the combustion-chamber, the edges of which seat at the bottom in a lipped groove on the side walls of the fire-box, and the front and back edges of which are similarly jointed to the header and back plate respectively; and means for drawing the latter joints tight.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WESLEY EDGAR VANSTONE.

In presence of—
ROWLAND BRITAIN,
ELLICE WEBBER.