

(No Model.)

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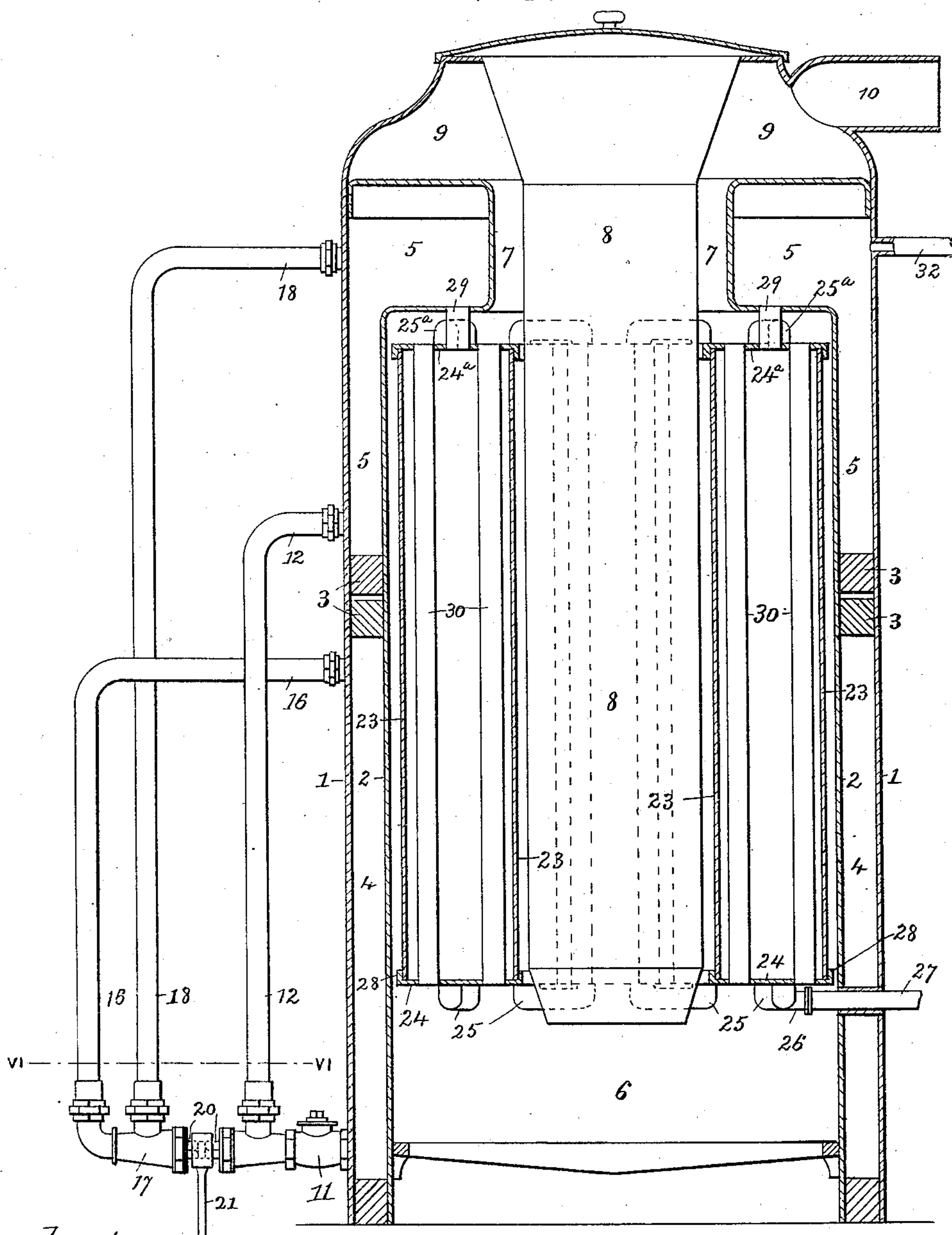
E. MEDDEN.

HEATER FOR STEAM FIRE ENGINES.

No. 376,330.

Patented Jan. 10, 1888.

FIG. 1.



Attest.

Geo. T. Smallwood,
W. Hopkins.

Inventor:

Edwin Medden,
By Knight Bros. Attys

(No Model.)

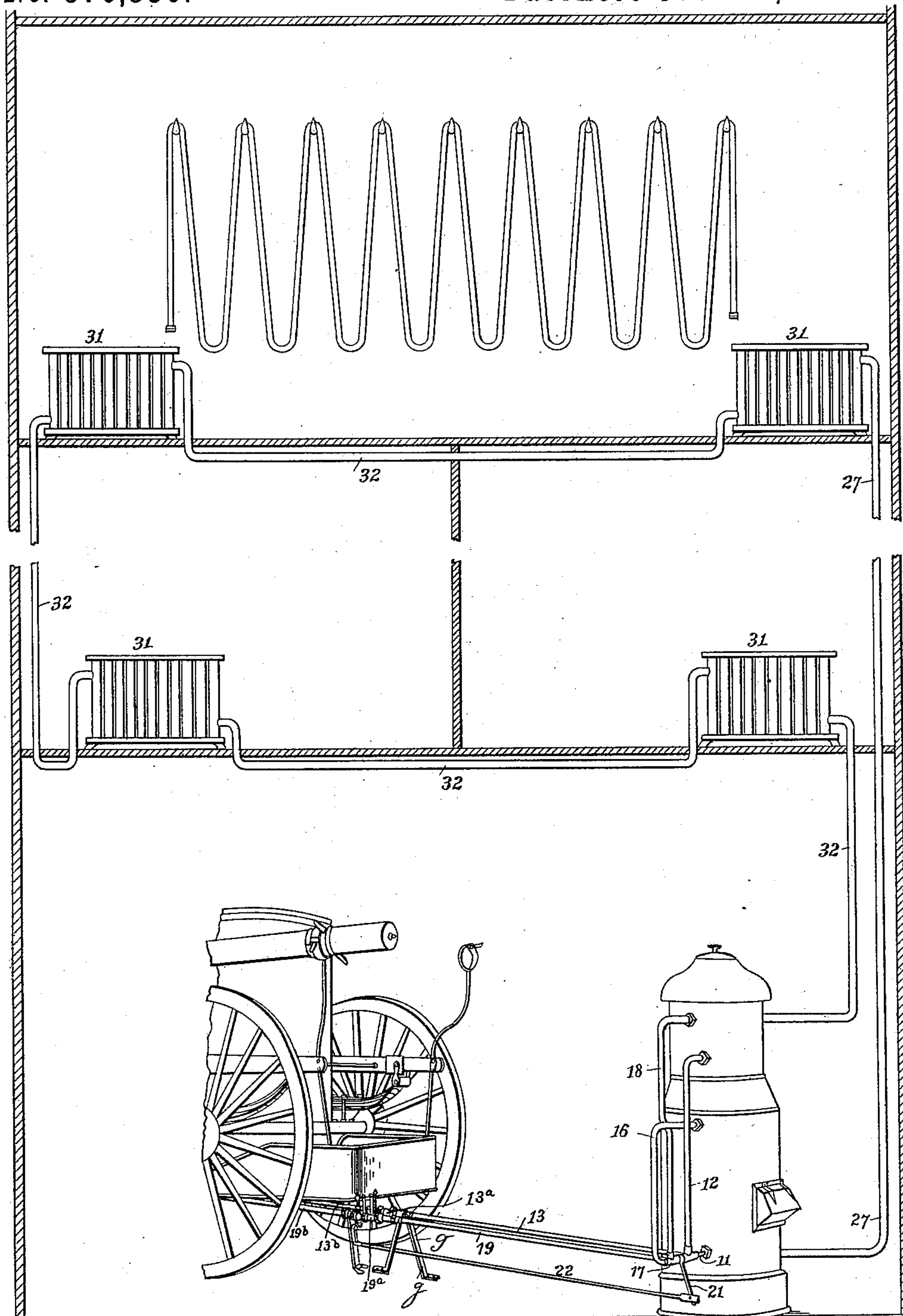
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Attest.
Geo. T. Smallwood.
L. M. Hopkins.

FIG. II.

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(No Model.)

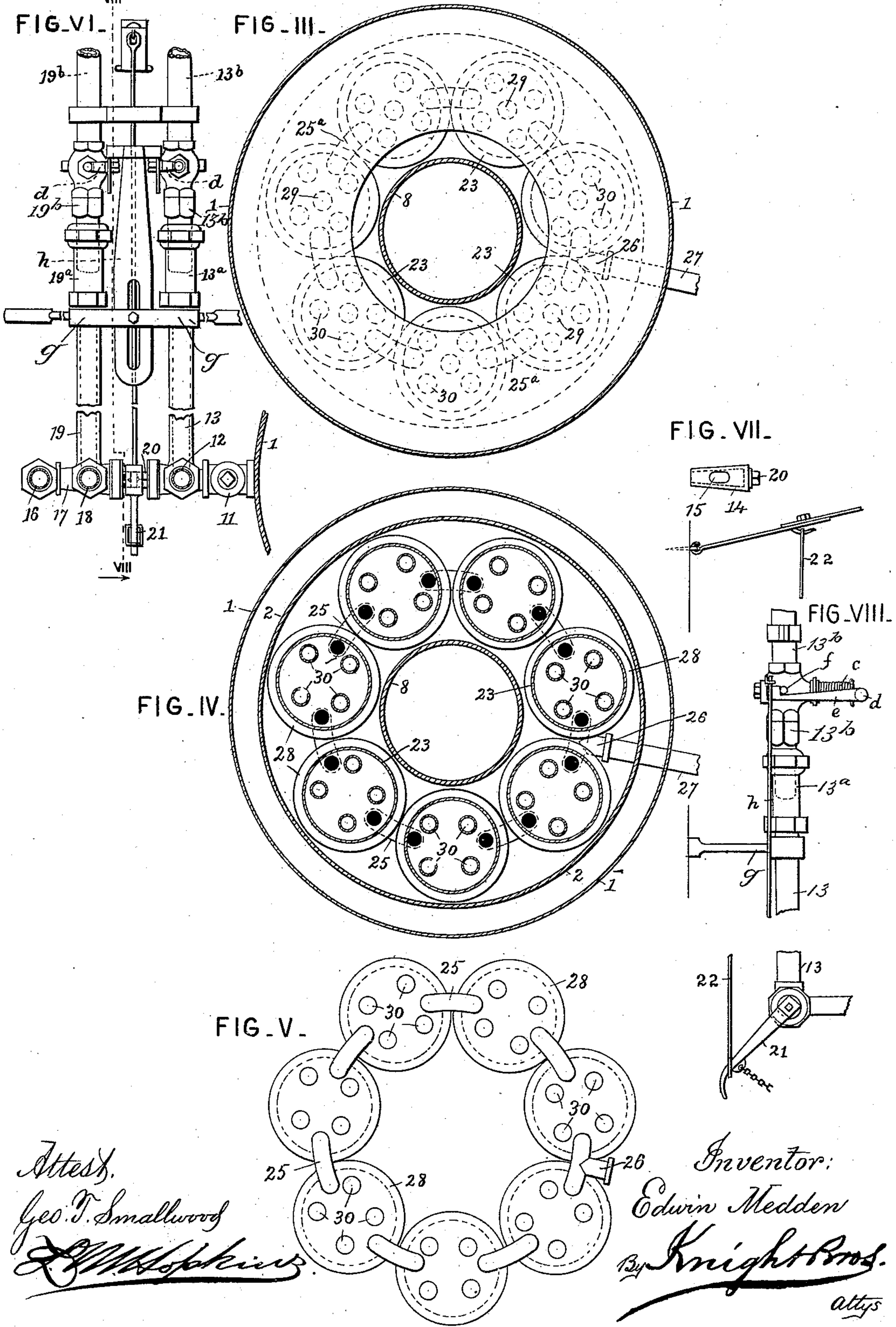
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HEATER FOR STEAM FIRE ENGINES.

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UNITED STATES PATENT OFFICE.

EDWIN MEDDEN, OF SENECA FALLS, NEW YORK, ASSIGNOR TO THE SILSBY MANUFACTURING COMPANY, OF SAME PLACE.

HEATER FOR STEAM FIRE-ENGINES.

SPECIFICATION forming part of Letters Patent No. 376,330, dated January 10, 1888.

Application filed January 29, 1887. Serial No. 225,872. (No model.)

To all whom it may concern:

Be it known that I, EDWIN MEDDEN, a citizen of the United States, residing at Seneca Falls, in the county of Seneca and State of New York, have invented certain new and useful Improvements in Heaters for Steam Fire Engines, of which the following is a specification.

This invention relates to that class of heaters which are designed to maintain a constant circulation of hot water through the boilers of steam fire-engines while standing in the engine-house, in order that they may be ready for operation at a moment's notice without the necessity of keeping up a fire in the fire-box of the engine itself.

This invention consists, essentially, in the combination, with a heater of this class, of a system of circulating-pipes and radiators situated in any part or parts of the engine-house for the purpose of warming the same by the fire which heats the water in the engine-boiler, the radiators being suitably connected with the heater by pipes.

This invention further consists in certain details in the construction of the heater itself, whereby it is rendered better adapted for the new purpose to which I apply it, all of which are hereinafter particularly pointed out in the claims, being first fully described with reference to the accompanying drawings, in which—

Figure I is a vertical sectional elevation of the improved heater. Fig. II is an elevation showing the heater, the radiators located in rooms remote from that in which the heater is situated, the pipes for connecting the heater with said radiators, and portions of the pipes for connecting the heater with the fire-engine boiler. Fig. III is a horizontal section through the smoke-box on the line III III, Fig. I. Fig. IV is a horizontal section on the line IV IV, Fig. I, looking downward. Fig. V is a plan view of a casting, hereinafter particularly described. Fig. VI is a horizontal section on the line VI VI, Fig. I. Fig. VII is a detail view of one of the valves, hereinafter particularly described. Fig. VIII is a vertical section on the line VIII VIII, Fig. VI, showing in detail the construction of the mechanism

for automatically operating the valves in the engine sections of the circulating-pipes when the engine moves off.

1 represents the outer, and 2 the inner, wall or casing of the heater placed at such distance apart as to form the necessary water-space, which space is divided by a horizontal partition, 3, into two annular chambers, 4 and 5. The lower chamber, 4, is in the nature of a water-jacket surrounding the fire-box 6 and the combustion-chamber, while the upper chamber, 5, is made to project inward horizontally over the combustion-chamber, but is still annular, a central passage, 7, being left for the passage of the smoke and also for the coal-magazine 8. This magazine is open at top for the reception of coal and projects far down within the heater, terminating in the fire-box, as is usual, it being made of less diameter than the passage 7, so as to leave an annular space for the escape of smoke, &c., which finds its escape through a smoke-box, 9, and flue 10.

11 is a section of pipe communicating with the lower chamber, with which communicates a pipe, 12, whose other extremity communicates with the lower part of the hot-water-circulating chamber 5, and a second pipe, 13, which communicates, through the medium of a slip-joint, 13^a, with a pipe, 13^b, which latter in turn communicates with the lower part of the boiler of the fire-engine. At the intersection of the pipes 12 and 13 the pipe 11 is fitted with a hollow valve-plug, 14, provided with an open end and a single opening, 15, in its side, which places the pipe 11 in communication with one or the other of said branch pipes 12 or 13.

16 is a pipe, one end of which communicates with the upper part of the lower annular water-chamber, 4, and the other end with a short section of pipe, 17, with which latter communicate two pipes, 18 and 19, communicating, respectively, with the top part of the hot-water-circulating chamber 5 and a pipe, 19^b, which latter in turn communicates with the top part of the fire-engine boiler, the pipes 19 and 19^b being united by a slip-joint. This joint (which is in all respects similar to the joint between the sections 13 and 13^b) consists

of a socket, 19^a, formed in the extremity of the pipe 19, into which the extremity of the pipe 19^b is adapted to slip, any suitable packing being employed for forming a tight joint. This section 17, like the section 11, is provided at the intersection of the pipes 18 and 19 with a valve-plug similar to 14 15. One end of each of these valve-plugs is provided with a squared head, 20, and the two heads are placed directly opposite and in close proximity to each other, so that both may enter the eye of a key, 21, which is so connected by a chain or rod, 22, with the fire-engine that when the latter moves off the valves 14 will be so shifted as to bring their ports 15 in communication with the pipes 12 and 18, respectively, thereby establishing communication between the bottom of the lower water chamber, 4, and the bottom of the upper circulating-chamber, 5, and also between the top of the lower water-chamber, 4, and the top of the upper circulating-chamber, 5, at the same time completely severing communication between the heater and the engine-boiler pipes 13 and 19.

The pipes 13^b and 19^b are provided with valves, which are closed automatically by springs *c*, which surround their stems, when the device which holds said valves open is tripped by the following means:

d are cross heads or arms, one of which projects laterally from the extremity of the extended stem of each valve, to which arms are connected, by hinge-joints, depending hooks *e*, which, when the valve-stems are depressed, (and the valves open,) are in engagement with the under sides of pins or studs *f*, projecting from the sides of the pipes or valve-casings.

h is a tripping plate or hook, which engages at one end with the lower extremities of the hooks *e*, its other end being made secure to the bracket *g*, which supports the extremities of the pipes 13 and 19. While the engine is in the parts occupy the positions shown in the drawings, the pipes 13 13^a 19 19^a being in communication, the stems of the valves in the pipes 13^a and 19^a depressed, the hooks *e* in engagement with the studs *f*, and the tripping-hook *h* in engagement with the lower extremities of said hooks. When the engine moves off, the tripping-hook *h* holds the lower ends of the hooks *e* until the engine has moved off sufficiently far to move the studs *f* from engagement with said hooks, whereupon the springs *c*, surrounding the valve-stems, quickly elevate them, closing the valves and preventing the escape of water.

It will be understood that when the lower chamber, 4, and upper circulating-chamber, 5, are thus placed in communication there will be a constant circulation of water from the top of the chamber 4 into the top of the chamber 5 through pipes 16, 17, and 18, and from the bottom of chamber 5 into the bottom of chamber 4 through the pipes 12 and 11. These pipes 11, 12, 16, 17, and 18, or their equivalents, are hereinafter spoken of as "circulating-pipes." On the other hand, when

the engine-boiler is in communication with its pipes 13 and 19 and the valve-plug turned to place said pipes in communication with the pipes 11 and 17, respectively, communication with the pipes 12 and 18 is cut off, and the circulation is then carried on through the engine-boiler, instead of through the circulating-chamber, as above described. Whatever be the positions of these valves 14, there will always be a constant circulation through the following parts.

23 are large pipes or drums, forming water-legs, any desired number of which may be arranged vertically in an annular series within the combustion-chamber, each of said pipes being closed with a head at each end, as shown more clearly in Fig. I. The heads 24, which close the lower ends of these drums, are all formed of a single integral casting—such as shown in Fig. V—the heads proper being united by short pipe-sections 25, communicating with apertures formed through said heads, so that the interiors of all the drums 23 shall be in communication. One of these short pipes 25 is formed with a socket or T-branch, 26, for the reception of the end of a pipe, 27, through which the water of condensation or steam is returned into the heater after it has passed through the radiators, hereinafter more particularly referred to. Each of the several heads is provided with a marginal flange, 28, which fits around the lower part of the tube 23, and so secured as to form a perfectly tight joint.

The casting of which the upper heads, 24^a, are formed is a counterpart of that used for the lower heads, altered in the following particulars—that is to say, the T branch or socket which, when the casting is used for the lower heads, communicates with the pipe 27 is plugged up when the casting is used for the upper heads, and each of said heads centrally perforated for the passage of a short tube, 29, by which the interior of the drum, which is closed, is placed in communication with the hot-water-circulating chamber 5. Both heads of each drum are correspondingly perforated for the reception of the ends of smaller tubes, 30, which pass through said drums and are opened at both ends for the passage of heat, whereby the water is quickly heated. These tubes are preferably secured in place by expansion, so as to form perfectly tight joints.

31 represents radiators placed in rooms remote from that in which the heater is situated, and 32 a pipe which connects said radiators with the steam-space of the circulating-chamber 5 of the heater—that is to say, in practice the apparatus is filled with water to such a height that a space for steam is left in the upper part of the chamber 5, and it is with this steam-space that the outgoing branch 32 of the radiator-pipe communicates. Any desired number of these radiators may be employed and situated at any desired places, the last one of the series being connected with the pipe 27, by which the water of condensation

or steam is returned into the bottom of the circulating-chamber 5 through pipes or drums 23, with which latter said pipe is in direct communication.

5 I am aware that it has been proposed to connect the supply-pipe of a steam-boiler with the lower end of water-leg extending downward within the combustion-chamber, and also that it has been proposed to connect one end
10 of a radiator-pipe (such as the pipe 27 32 employed by me) with the lower portion of a water-jacket which surrounds the fire-box, and I do not claim either as my invention; nor do I regard either as the equivalent of that portion
15 of my invention which consists in connecting the return branch 27 of the radiator-pipe directly with the lower end of a water-leg situated within the combustion-chamber. The advantage of this construction is that the circulation through the radiator-pipe is greatly
20 accelerated. The water within the water-leg, being subjected to a more intense heat than the water in any other part of the apparatus, will circulate or flow upward faster and with
25 greater force than the water in any of the said other parts, and in so doing cause the water to be exhausted from the pipe 27. These radiators may of course be used in any room or
30 rooms of the engine-house, and are particularly useful for heating the tower or other rooms wherein the hose is dried, heat for drying the hose being of course desirable at all seasons of the year. The improved heater is
35 therefore not only adapted for maintaining a constant circulation of hot water through the engine boiler during all seasons of the year, but is further adapted by the combination
40 therewith of the radiator-pipes 32 27 and the radiators 31 for heating the tower or hose-loft during all seasons, and for heating the various other rooms of the building during the winter season.

It will be understood that the upper ends of the drums are in communication with each
45 other through the medium of the short pipes 25^a.

I am aware that it has been proposed to combine with a heater a single set of pipes, whereby hot water may circulate from the heater to
50 and through the boiler of a steam fire-engine, and thence through a heating-coil, and thence back to the heater, suitable valves being provided whereby the circulation through the boiler may be cut off, and the circulation maintained through the heater and the heating-coil
55 only. This is not the equivalent of my present invention.

Having thus described my invention, the following is what I claim as new therein and
60 desire to secure by Letters Patent:

1. A heater having a hot-water chamber, pipes communicating therewith, and joints for uniting said pipes with other pipes communicating with the boiler of a steam fire-engine, in
65 combination with radiators and a pipe communicating at its ends with said heater and at intermediate points with said radiators, the

said radiator-pipe being entirely separate and distinct from the pipes for establishing communication between the water-chamber of the
70 heater and the boiler of the fire-engine, substantially as and for the purpose set forth.

2. A heater having a hot-water chamber, pipes for establishing communication between said chamber and the boiler of a steam fire-engine for maintaining a circulation of water
75 through said chamber and boiler, and circulating-pipes communicating at their respective ends with the top and bottom of said chamber for maintaining a circulation within the
80 heater when communication with the fire-engine boiler is cut off, in combination with radiators and a pipe communicating at intermediate points with said radiators and at its extremities with said heater, said radiator-pipe
85 being entirely separate and distinct from both the other sets of pipes, substantially as and for the purpose set forth.

3. A heater having a hot-water chamber, pipes 13 19, communicating therewith, slip-joints 13^a 19^a, for connecting said pipes with
90 pipes 13^b and 19^b, respectively, communicating with the boiler of a steam fire-engine, and valves for closing all of said pipes, actuated automatically by the starting of the engine, in
95 combination with radiators and a pipe communicating at its ends with the heater and at intermediate points with said radiators, the said radiator-pipe being entirely separate and distinct from the pipes for establishing communication between the water-chamber of the
100 heater and the fire-engine boiler, substantially as and for the purpose set forth.

4. The combination of the heater, having a combustion-chamber, the hot-water chamber,
105 and a number of drums located within the combustion chamber, communicating at top with said water-chamber and communicating at their lower ends with each other, and a pipe communicating at its respective ends with said
110 water-chamber and the lower ends of said drums, and the radiators communicating with said pipe, substantially as set forth.

5. The combination, with the combustion-chamber and the hot-water chamber, of the
115 drums communicating with said water-chamber and extending downward within the combustion-chamber, a pipe communicating at its respective ends with said water-chamber and drums, and short pipes placing the bottoms
120 of all of said drums in communication, substantially as set forth.

6. The combination, with the combustion-chamber, the hot-water chamber, and the
125 pipes or drums communicating with said water-chamber and extending downward within the combustion-chamber, of the short pipes connecting said drums together at both top and bottom, substantially as set forth.

7. The combination, with the combustion-chamber, hot-water chamber, the drums, and
130 the short pipes connecting the upper ends of said drums with said water-chamber, of the flues passing through said drums, and a pipe

connecting the said water-chamber with the lower ends of said drums, substantially as set forth.

8. The combination of the water-chamber 5, a plurality of drums, 23, and heads 24, for closing each end of each of said drums, all the heads for closing the drums at either end being united by short pipes 25, cast integrally therewith and communicating with the interiors of the drums through perforations formed in the heads, the tubes 30, open at both ends and passing through said drums, the heads being provided with perforations for the reception of said tubes, the pipes 29, forming communication between the upper ends of said drums and the water-chamber, and means forming communication between said chamber and the lower ends of said drums, substantially as and for the purpose set forth.

9. The combination, with the heater having the combustion-chamber, separate hot-water chambers 4 and 5, the circulating-pipes for maintaining a circulation between said water-chambers, and the water-legs or drums communicating with the upper water-chamber and extending downward within the combustion-chamber, of the radiator-pipe communicating at one end with the upper water-chamber and at the other end with the lower end of said water-leg or drum, substantially as and for the purpose set forth.

10. The combination of the heater having the hot-water chambers 4 5, the circulating-pipes, each communicating at its opposite

ends with the respective chambers, pipes 13 and 19, each communicating with one of the circulating-pipes, slip-joints 13^a and 19^a for connecting the pipes 13 and 19 with pipes 13^b and 19^b, which latter in turn communicate with the boiler of a steam fire-engine, valves placed at the intersections of the pipes 13 and 19 and the circulating-pipes for the purpose set forth, radiators 31, situated in any parts of the building, and the radiator-pipe communicating at its ends with said heater and at intermediate points with said radiators, substantially as and for the purposes set forth.

11. A heater having a hot-water chamber, pipes communicating therewith and with the boiler of a steam fire-engine, radiators situated in any desired part of the building, and a pipe communicating at one end with the steam-space of said hot-water chamber—*i. e.*, above the water-line—at the other end with the bottom of the said water-chamber and at intermediate points with said radiators, said radiator-pipe being entirely separate and distinct from the pipe which forms communication between the hot-water chamber and the boiler of the fire-engine, whereby hot water is circulated through the said boiler and steam supplied to the radiators, the water of condensation being returned to the hot-water chamber, substantially as and for the purposes set forth.

EDWIN MEDDEN.

Witnesses:

LERROY J. EMERY,
BENJAMIN B. HALL.