

(No Model.)

2 Sheets—Sheet 1.

J. D. KUTZ.
WATER HEATING APPARATUS.

No. 420,807.

Patented Feb. 4, 1890.

Fig. 1.

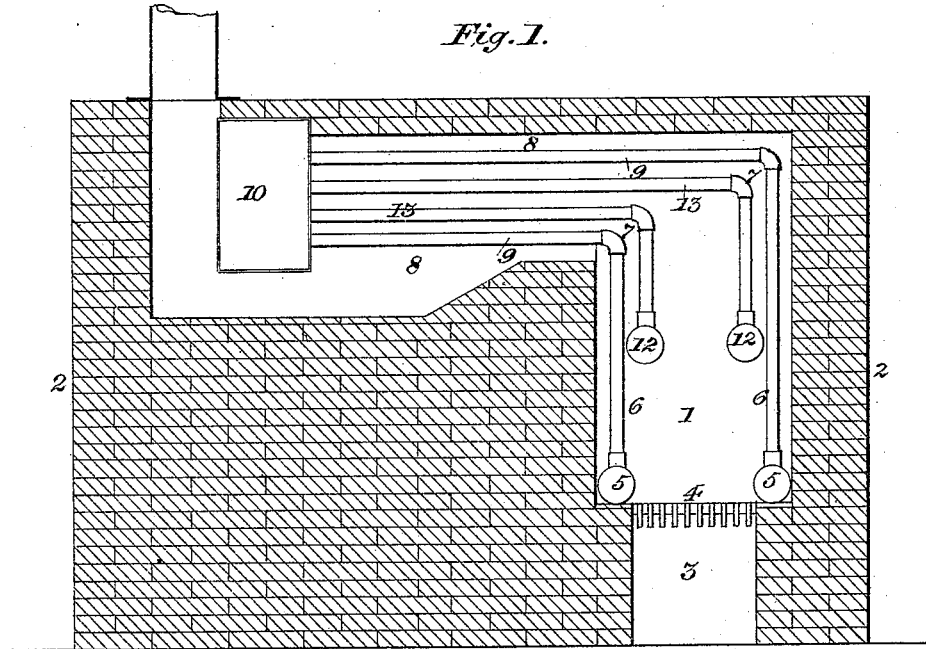


Fig. 2.

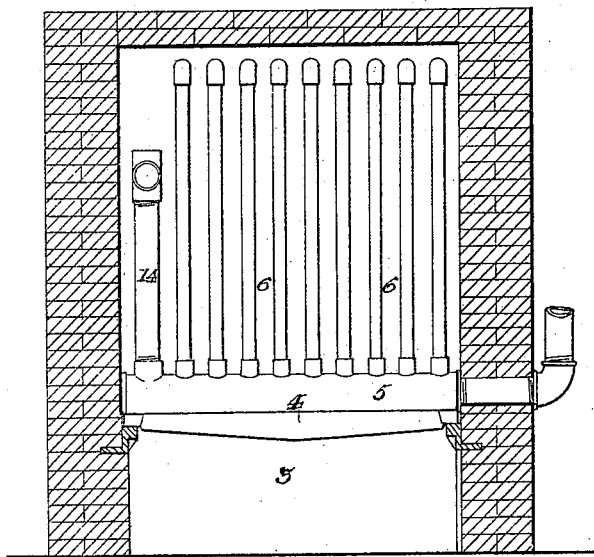
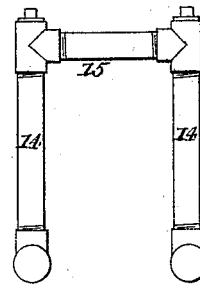


Fig. 3.



Witnesses:

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Inventor:

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By James L. Norris,
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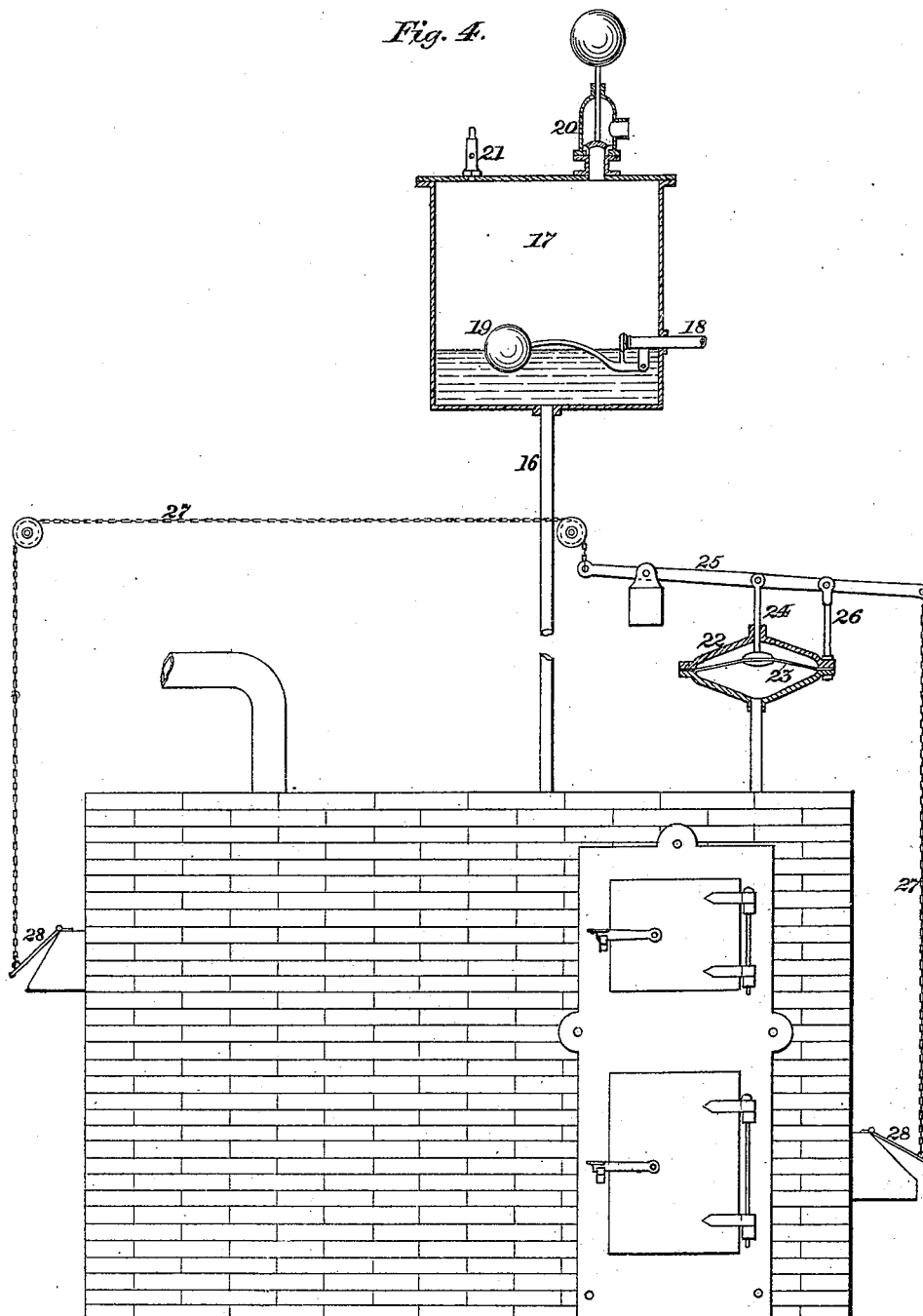
2 Sheets—Sheet 2.

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Fig. 4.



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UNITED STATES PATENT OFFICE.

JOHN DANL. KUTZ, OF WARSAW, INDIANA.

WATER-HEATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 420,807, dated February 4, 1890.

Application filed July 3, 1889. Serial No. 316,422. (No model.)

To all whom it may concern:

Be it known that I, JOHN DANL. KUTZ, a citizen of the United States, residing at Warsaw, in the county of Kosciusko and State of Indiana, have invented new and useful Improvements in Water-Heating Apparatus, of which the following is a specification.

My invention relates to sectional water-heaters, and the purpose thereof is to provide a water-heating apparatus composed of vertical and horizontal tubes connecting the manifolds of the generator with a circulating-drum under which the products of combustion are driven after passing around the tubes which communicate with said drum.

It is my purpose, also, to provide a simple and novel construction and organization of parts, whereby the manifolds and circulation-tubes of a sectional water-heater form the sides of the furnace or fire-box, while separate manifolds are suspended within the furnace and connected with the lower manifolds in such manner that a perfect circulation may be obtained while the suspended or upper manifolds are also provided with a suitable support.

It is my further purpose to provide a simple organization, whereby the draft of the furnace shall be automatically controlled, and to combine with the heating apparatus means whereby sudden or excessive pressure may be relieved and the radiators and manifolds filled and the water therein kept at a substantially-uniform point.

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

Referring to the accompanying drawings, Figure 1 is a front elevation of a water-heating apparatus embodying my invention. Fig. 2 is a sectional elevation, taken from the right-hand end of Fig. 1. Fig. 3 is a detail view of the circulation-connections between the suspended manifolds and those below. Fig. 4 is a diagram of the heater, the pressure-tank, and their connections, the draft-regulator being shown in sectional elevation.

In the said drawings, the reference-numeral 1 denotes the furnace or fire-box, which is inclosed by suitable brick-work 2 in the ordi-

nary manner. Within this furnace and above an ash-box 3 is arranged a rocking-grate 4 of the ordinary construction.

In the plane of the grate-surface, or a little above the same, the fire-box 1 is enlarged laterally or widened, as shown in Fig. 1, and upon each side is placed a manifold 5, resting upon the masonry or other suitable support and forming the sides of the furnace. From these manifolds rise circulating-tubes 6, following the general direction of the walls of the furnace, and having elbows 7 at the angles formed by the communicating draft-space and combustion-chamber 8. Horizontal tubes 9 connect with these elbows, and after traversing the combustion-chamber these pipes enter a tank or drum 10, arranged at the end of said chamber.

Within the furnace 1, at a suitable distance above the grate, are arranged manifolds 12, which may be varied in number according to the requirements of the generator. These manifolds are connected by pipes 13 with the circulation tank or reservoir 10, and they likewise communicate with the lower manifolds 5 by means of vertical pipes 14, having T-connections on their upper ends to receive a cross-connection 15, with which the ends of the upper manifolds connect and by which the latter are in part supported. The hot water and steam is delivered from the reservoir to the radiating-coils and is returned therefrom by gravity to the ends and sides of the manifolds through suitable pipes provided for the purpose.

Connected with the manifolds of the heater by a pipe 16 is a closed tank 17, which is arranged a little above the level of the highest radiator in the building. Entering this tank is a water-supply pipe 18, closed by any suitable form of valve operated by a float 19 within the tank. Upon the closed top of said tank is a safety-valve 20 and an air-valve 21, opening inward to admit air to enter as the water flows from the tank.

Upon the heater at any convenient point is placed a diaphragm regulator 22, consisting of a closed casing having an interior elastic diaphragm 23, upon which rests a piston 24, packed through the upper part of the regulator-casing and connected with a lever

25 fulcrumed on a support 26. The ends of this lever are connected by chains or wires 27 to the draft-doors 28 of the heater. By this construction the radiators and manifolds 5 of the heater are filled to the level of the float in the tank, the remainder of the space being filled with steam or air. Any increase in heat will cause an expansion of the water in the manifolds, which at a predetermined 10 point will operate the regulator and close the draft-doors. Should the water be suddenly expanded, or should a body of steam form suddenly, the air will be forced through the safety-valve on the tank and the over-pressure-relieved. As the pressure decreases the 15 diaphragm in the pressure-regulator will be relieved and the draft-doors will partly open, and in this manner the heat and pressure may be automatically controlled, as desired. 20

It must be understood that the tank is connected by a pipe with the highest radiator, which is in turn connected with the next, and so on through the series, the last radiator being connected with the heating manifolds. 25

What I claim is—

1. In a water-heater, a circulation-drum located in the draft-space and connected by 30 vertical and horizontal tubes with manifolds lying in the fire-chamber and forming the sides thereof, substantially as described.

2. In a water-heating apparatus, a fire-box or furnace-chamber laterally widened above 35 the grate, and having manifolds lying upon each side thereof and forming the side walls of said furnace, substantially as described.

3. In a water-heating apparatus, the combination, with a furnace-chamber widened 40 above the grate, of manifolds lying upon each side thereof and suspended over said grate to

form the side and top of said furnace-chamber, substantially as described.

4. In a water-heating apparatus, the combination, with the furnace-chamber widened 45 above the grate, of manifolds lying upon each side, a circulation-tank arranged at or near the end of the draft-space and connected with the manifolds by vertical and horizontal pipes, separate manifoldssuspended above the grate 50 and connected to the tank, and a cross-connection formed of a pipe jointed to the ends of upright tubes rising from the side manifolds, said cross-connection communicating with the suspended manifolds, substantially 55 as described.

5. In a water-heating apparatus, the combination, with a furnace structure, of a circulation-drum arranged in the draft-space and connected by vertical and horizontal tubes 60 with manifolds located in the fire-chamber and forming sides thereof, and a regulator, substantially as described, connected with the manifolds to govern the supply of water thereto. 65

6. A water-heating apparatus consisting of a furnace structure, a circulation-drum in the draft-space, manifolds in the fire-chamber forming sides thereof and connected by 70 vertical and horizontal pipes with the drum, a regulator connected with the manifolds and governing the supply of water thereto, and a pressure-regulator connected with the manifolds to govern the furnace-draft, substantially as described.

In testimony whereof I have affixed my signature in presence of two witnesses.

JOHN DANL. KUTZ.

Witnesses:

THOMAS J. NYE,
JOSEPH W. FUNK.