

(No Model.)

2 Sheets—Sheet 1.

D. F. MORGAN.
HOT WATER HEATING BOILER.

No. 519,132.

Patented May 1, 1894.

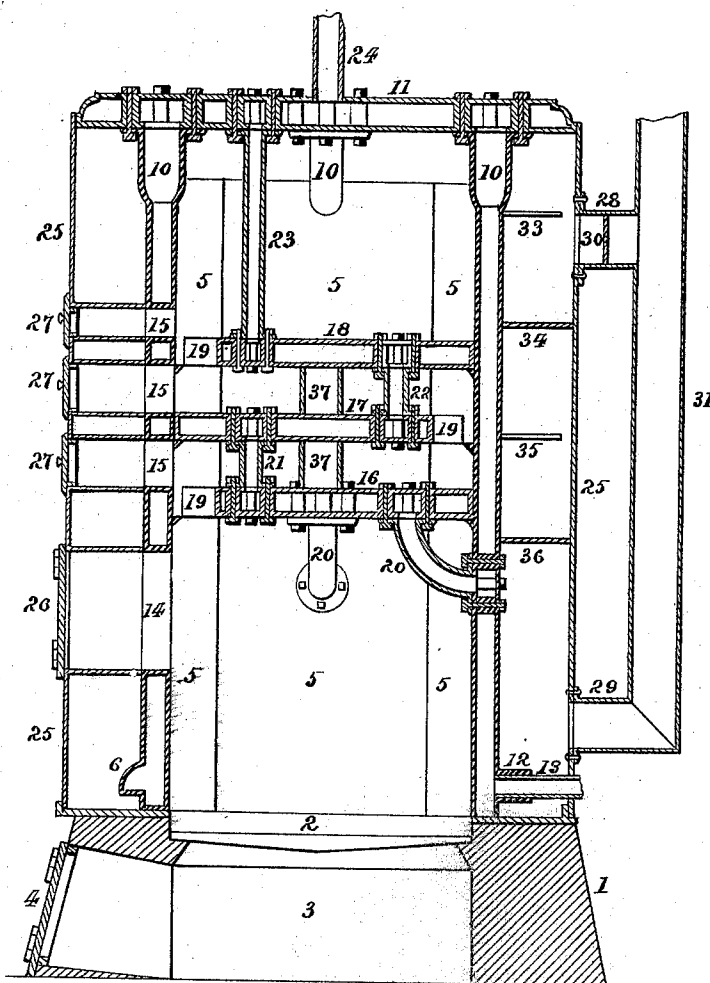


Fig. 1.

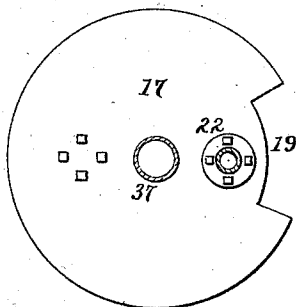


Fig. 2.

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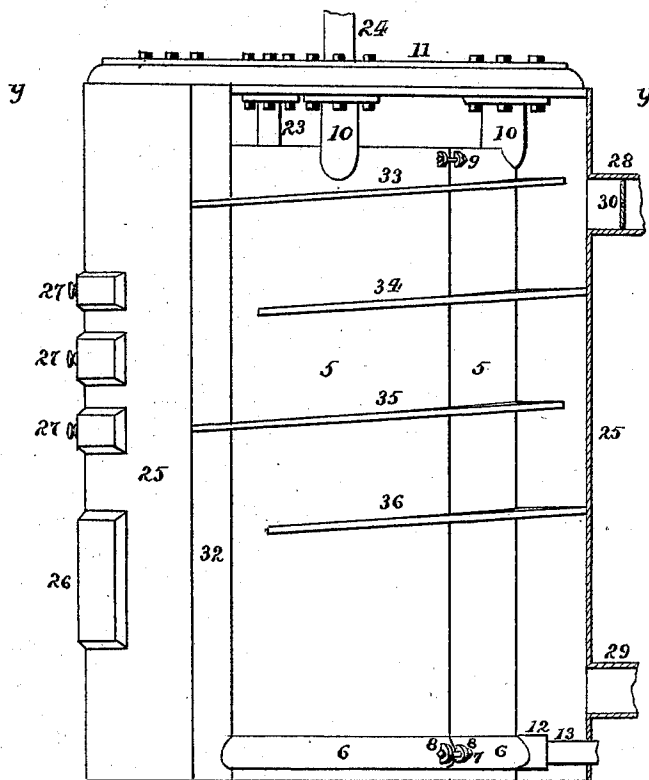


Fig. 3.

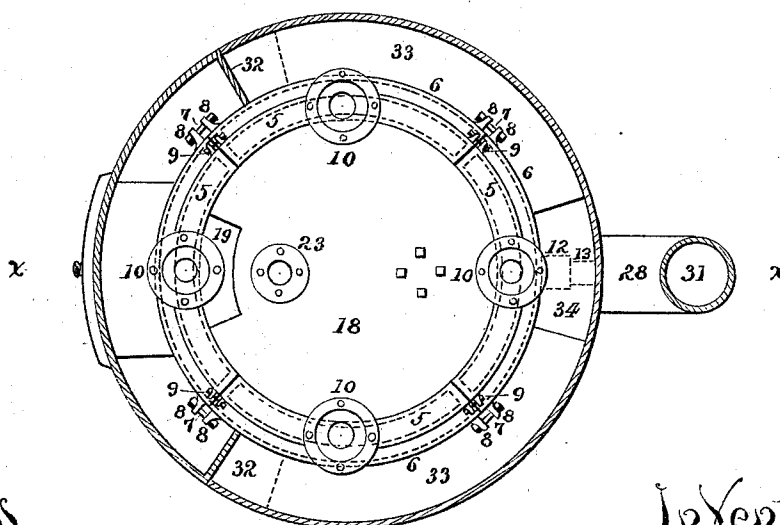


Fig. 4.

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UNITED STATES PATENT OFFICE.

DOCTOR F. MORGAN, OF AKRON, OHIO.

HOT-WATER HEATING-BOILER.

SPECIFICATION forming part of Letters Patent No. 519,132, dated May 1, 1894.

Application filed April 14, 1892. Renewed February 12, 1894. Serial No. 499,977. (No model.)

To all whom it may concern:

Be it known that I, DOCTOR F. MORGAN, a citizen of the United States, residing at Akron, in the county of Summit and State of Ohio, have invented a certain new and useful Improvement in Hot-Water Heating-Boilers, of which the following is a specification.

My invention has relation to improvements in that class of hot water heating boilers that are constructed of cast iron hollow sections and in which the water is subjected in thin layers to the heat of the fire and the products of combustion, and also wherein the products of combustion pass through flues on the inner and outer parts of the sections.

The objects of my invention are to provide new and improved forms of sections for constructing the boiler; to render the boiler shell practically hollow and entirely without hinderances to the vertical circulation in it; to combine vertical and horizontal shells to secure a more perfect circulation of the water, and a more complete exposure of it to the heat; to cause the products of combustion to more perfectly travel along the hollow water shells to secure a maximum of the heat therefrom, to reduce the distance traveled by the water and increase that traveled by the products of combustion, and generally to produce a new boiler, to simplify the construction and secure greater efficiency in heating in proportion to the amount of fuel consumed.

To the aforesaid purposes my invention consists in the peculiar and novel construction, arrangement and combination of parts hereinafter described and then specifically pointed out in the claims, reference being had to the accompanying drawings forming a part of this specification.

In the accompanying drawings in which similar reference numerals indicate like parts in the different figures: Figure 1, is a central, vertical section of my improved boiler at the line X, X, of Fig. 4; Fig. 2, a plan of the central, horizontal hollow disk shown in Fig. 1; Fig. 3, an elevation of the boiler with part of the outer case removed; and Fig. 4, a horizontal section of the boiler and case at the line y, y, of Fig. 3.

The operative parts of the boiler rest on and are supported by a metallic cast base 1, in which is fitted a grate 2, and which consti-

tutes an ash pit 3, provided with a cleaning door 4. As this base constitutes no part of my invention except as it sustains the boiler and grate, it may be of any desired form that will subserve the purpose.

The boiler body consists of four hollow shells 5, quadricylindrical in shape, closed except as hereinafter stated, enlarged on the outer face near the bottom to constitute a water ring 6, the ends of which enlarged portions have orifices which register in adjacent shells to form a water connection, as indicated by dotted lines in Fig. 4. Between the ends of this water ring in adjacent shells is placed a packing ring or gasket, and they are drawn together by bolts 7, which pass through lugs 8, cast on the shells. The upper ends of adjacent shells are similarly united by smaller bolts 9, which pass through lighter lugs similarly cast on the shells. There is thus constructed a hollow cylinder having hollow walls, and internally connected at the enlarged portion near the bottom. From the center of the top of each shell 5, is a pipe 10, terminating in a flange by which they are attached to and internally connected to the dome 11, which consists of a closed hollow disk. The back one of the shells 5, has an enlarged collar 12, which the inlet or return pipe 13, enters and is secured by screw threads or other suitable method of fastening. The front one of the shells 5, has through it three openings, a large one 14, for the feeding of fuel to the grate, and three smaller ones 15, for cleaning the tops of the hollow disks hereinafter mentioned. Inside the boiler shell thus constructed are placed on brackets or lugs on the inner faces of the shells 5, a series of hollow disks, in this case three, 16, 17, 18, all similar in size and construction except as hereinafter stated. Each has a segmental space 19, at one side, and orifices and bolt holes for a purpose to be stated. The lower disk 16, is placed with its space 19, toward the front and is internally connected by means of curved pipes 20, with the interiors of the side and rear shells 5. The shell 17, is placed with its space 19, at the back, and the shell 18, with its space to the front, so that the spaces of adjacent shells alternate. The shells 16, 17, and 18, are internally connected by pipes 21, 22, respectively, which

pipes also alternate in position with each other, and the shell 18, is similarly internally connected with the dome 11, by a pipe 23, which similarly alternates in position with the pipe 22. The hot water passes from the boiler by the pipe 24, and after passing through the different radiators, returns through the pipe 13.

All bolt holes in the shells, disks, and dome which pass through the water spaces are cored in casting, and are surrounded by a tube integral with the casting, so that no holes are drilled or tapped, and all possibility of leaking at bolt holes is avoided.

The entire boiler is surrounded by an outer case 25, in the front of which are openings which register with the openings 14, 15, in the front shell 5, and each connected with such opposite openings by spouts, the openings in the case 25, being closed by a firing door 26, and covers 27. In the space between the boiler and case on each side of the spouts from the front, are partitions 32, between the boiler and case. From the back of the case 25, an upper and lower pipe 28, 29, the former provided with a gate 30, connect the space between the boiler and case, and the uptake flue 31. The pipe 29, may if desired surround the pipe 13, to still further communicate its heat to the water in said pipe.

In the space between the boiler and case is a series of baffle plates 33, 34, 35, 36, the first and third having an opening at the back, and the second and fourth having openings between their ends and the partitions 32. By this arrangement the products of combustion are equally divided, one half passing down on each side of the boiler, thereby equalizing the heat about the boiler on different sides. Between the disks 16, 17 and 17, 18, are short hollow cylinders 37, to spread the products passing across the space between them.

In operation the water entering through the pipe 13, passes upward, a part entering the disk 16, through the pipes 20, and a part passing directly up to the dome 11. The water from the disk 16, passes successively to the disks 17, 18, and dome 11, and as the means of escape alternate from side to side, the water traverses each disk in its upward passage. The products of combustion rising from the grate pass through the spaces in the disks 16, 17, 18, and as these spaces alternate, they consequently traverse the face of each disk, until they escape over the top of the boiler and descend between the latter and the case

25, being alternately carried from front to back and vice versa by the baffle plates, until they escape to the uptake flue by the pipe 29. By this arrangement the water is kept in steady circulation, and continuously subjected to the heat of the fire and products of combustion in thin layers, and the heat comes in contact with the coldest water last.

I claim as my invention—

1. In a hot water heating boiler, a boiler body consisting of hollow shells in form of segments of a hollow cylinder, internally connected and clamped together, combined with a series of hollow disks mounted in said body and internally connected therewith and with each other, each having a side space to constitute a flue, and hollow dome internally connected with said disks and body, substantially as shown and described.

2. The hollow cylindrical boiler body, having hollow walls, combined with horizontal hollow disks, having side spaces for smoke flues, and a hollow dome, said body, disks and dome being internally connected, the spaces in adjacent disks being arranged alternately on opposite sides of said body, substantially as shown and described.

3. The boiler body having hollow walls, and the hollow disks, and dome, said body and dome being internally connected, combined with pipes connecting said body and lower disk, and pipes connecting said adjacent disks, and the upper disk and dome, the entrance and exit pipes of each disk being arranged to alternate on opposite sides of the body, substantially as shown and described.

4. The combination of the hollow body, consisting of hollow segmental shells internally connected, and the hollow dome internally connected with said body; and the hollow disks having smoke spaces arranged to alternate in adjacent disks, and internally connecting water pipes, uniting said disks, body and dome, the entrance and exit pipes of each disk arranged alternately therein, with the inclosing case connected with the uptake flue, and a series of baffle plates between said case and body, the openings in said plates arranged alternately at the back and near the front, substantially as shown and described.

In testimony that I claim the above I hereunto set my hand.

DOCTOR F. MORGAN.

In presence of—

C. A. DEXTER,

C. E. HUMPHREY.