

(No Model.)

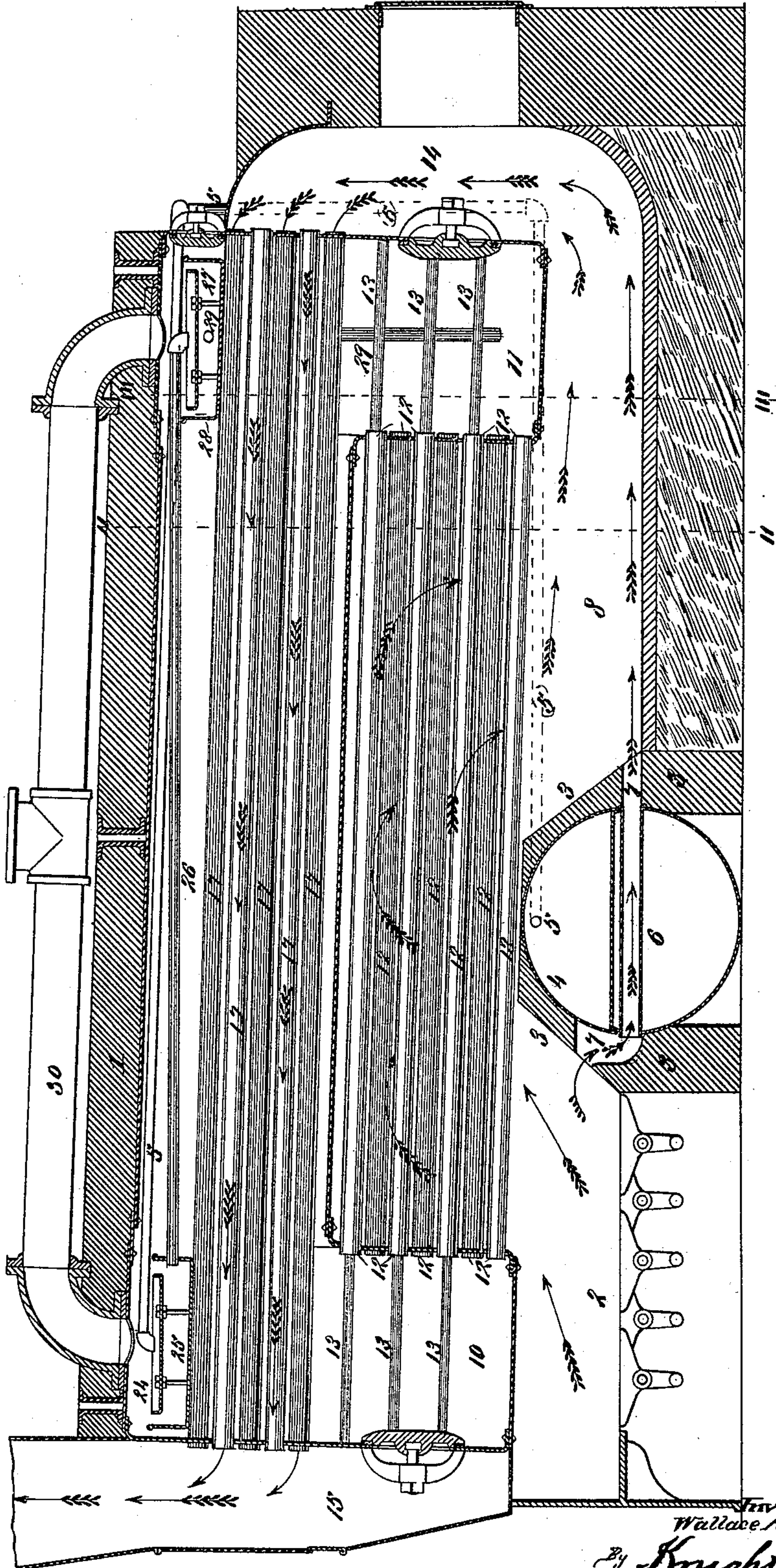
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W. A. MORSE.
STEAM BOILER.

No. 448,983.

Patented Mar. 24, 1891.

Fig. 1.



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S. H. Knight

Inventor,
Wallace A. Morse
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Fig. II

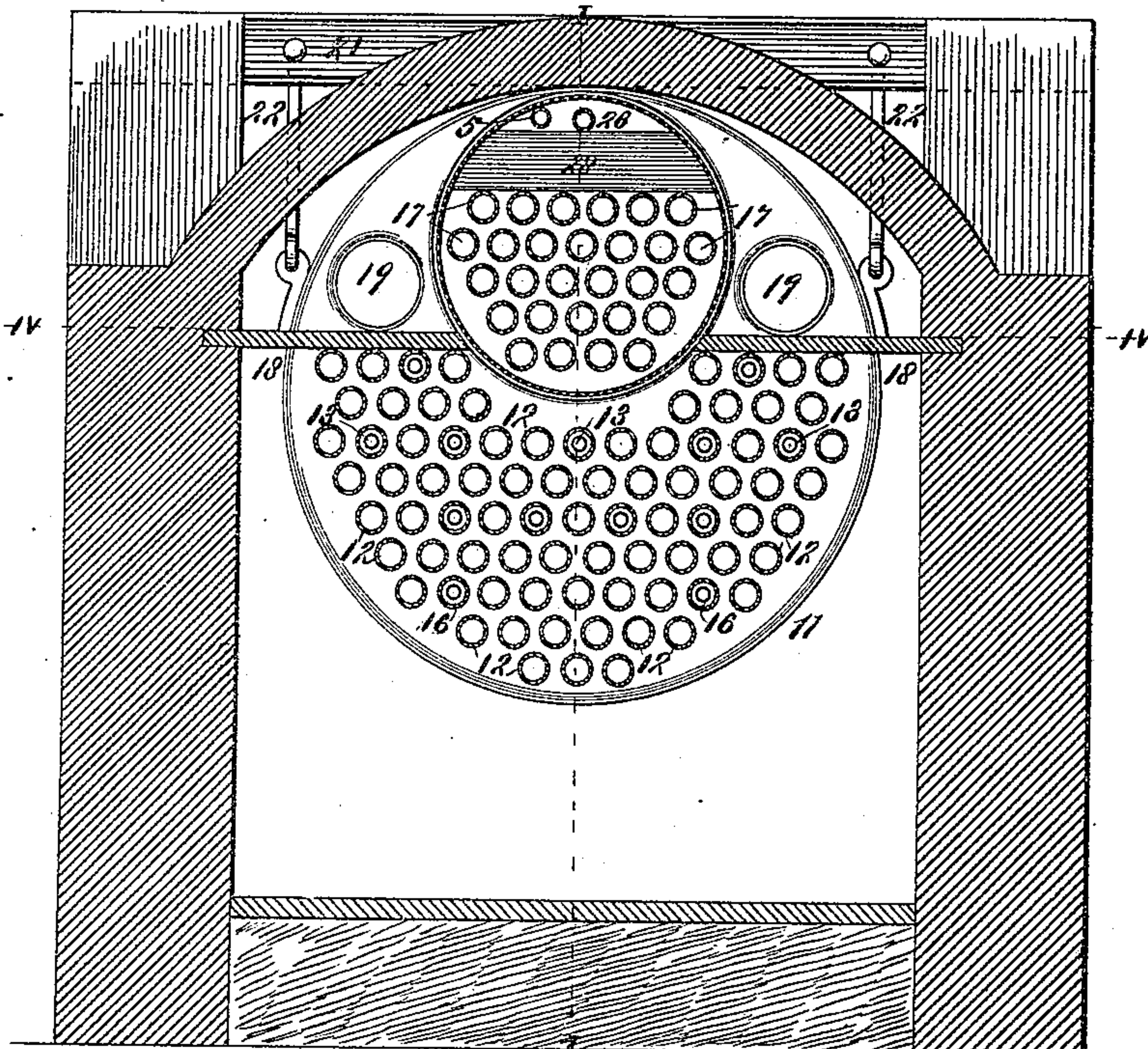
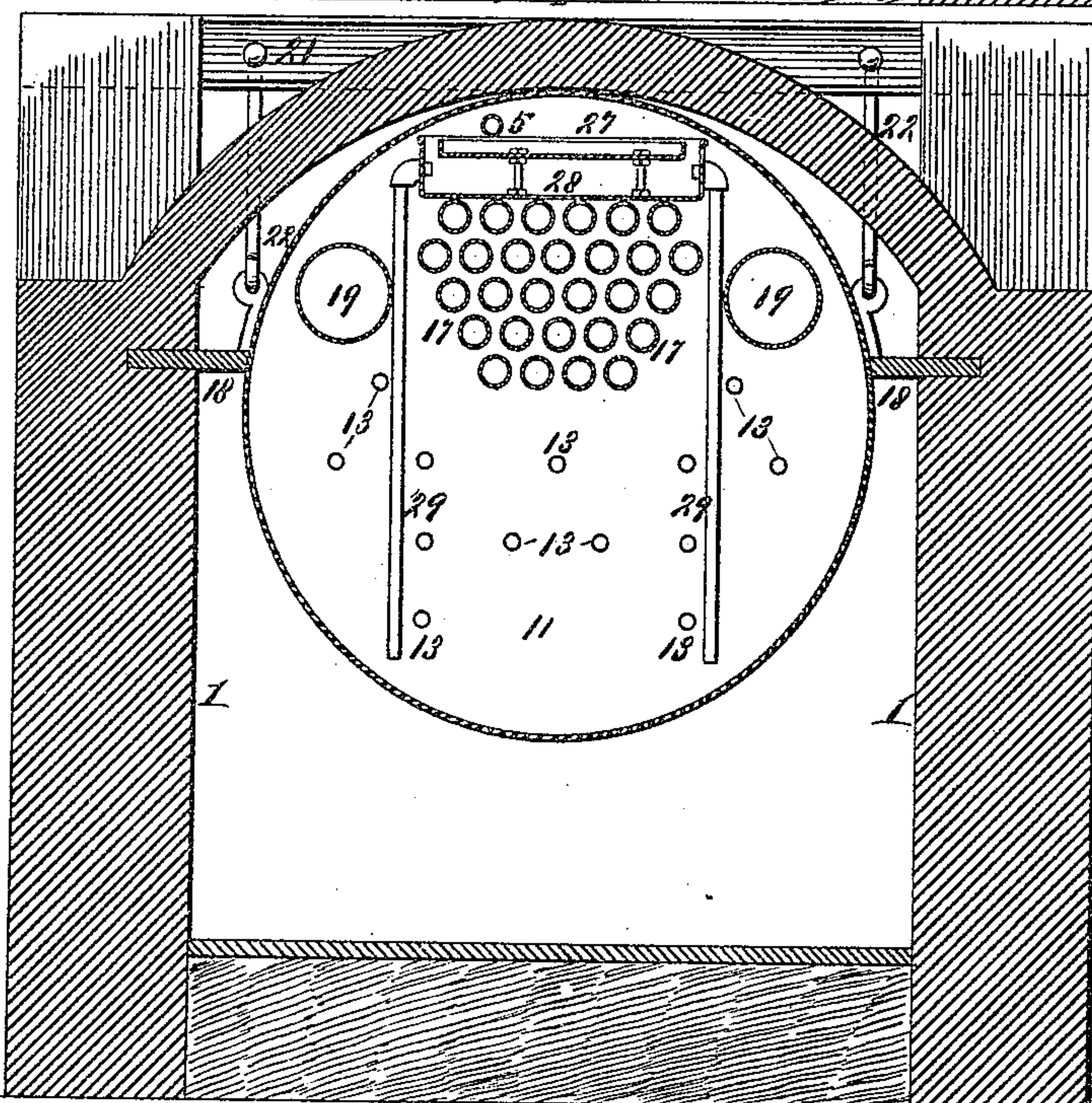


Fig. III



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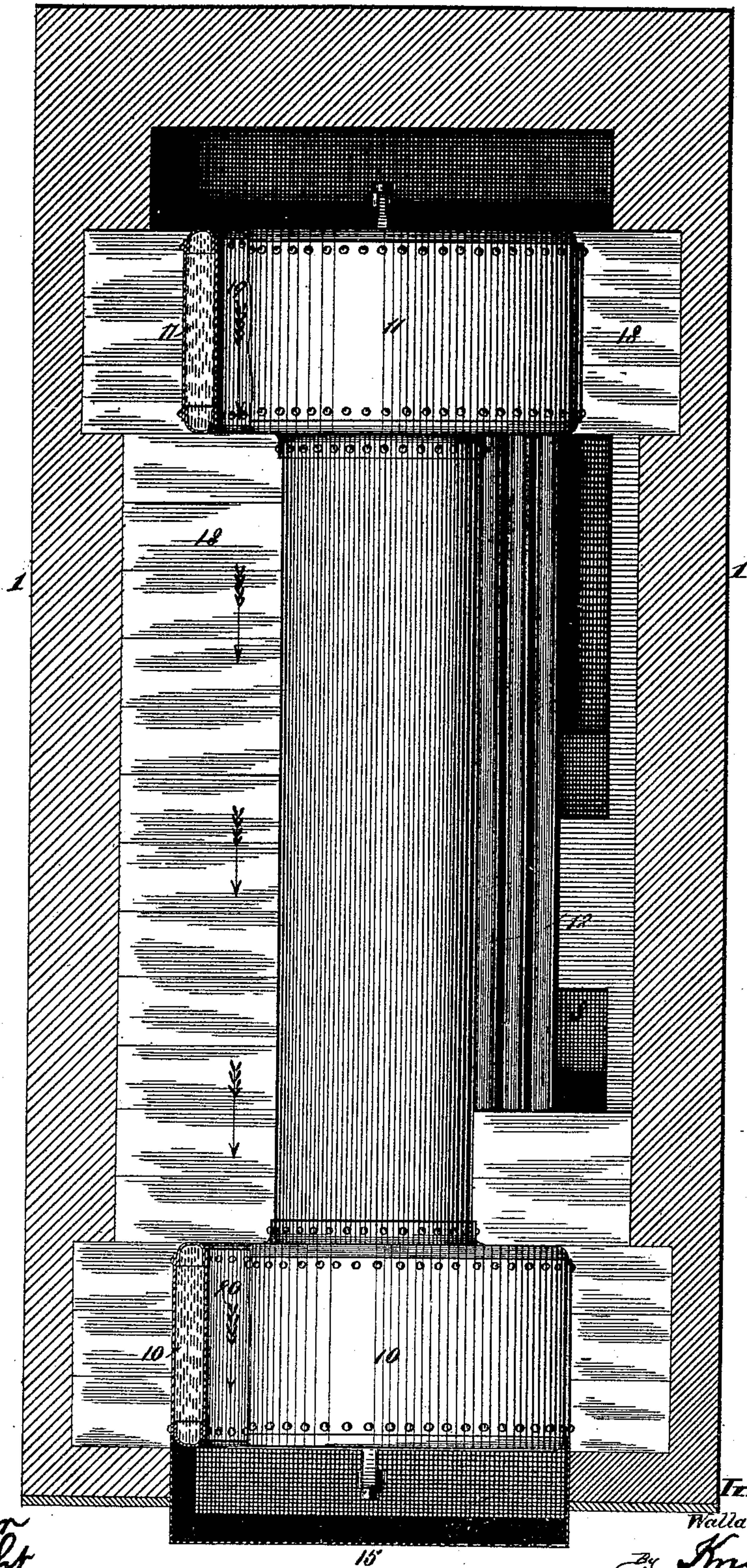
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Fig. IV.



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UNITED STATES PATENT OFFICE.

WALLACE A. MORSE, OF ST. LOUIS, MISSOURI, ASSIGNOR OF ONE-HALF TO
JOHN O'BRIEN, OF SAME PLACE.

STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 448,983, dated March 24, 1891.

Application filed August 20, 1890. Serial No. 362,501. (No model.)

To all whom it may concern:

Be it known that I, WALLACE A. MORSE, of the city of St. Louis, in the State of Missouri, have invented a certain new and useful Improvement in Steam-Boilers, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to an improved manner of constructing steam-boilers.

My invention consists in features of novelty hereinafter fully described, and pointed out in the claims.

Figure I is a vertical longitudinal section taken on line I I, Fig. II, and illustrative of my invention. Fig. II is a vertical transverse section taken on line II II, Fig. I. Fig. III is a similar view taken on line III III, Fig. I. Fig. IV is a horizontal longitudinal section taken on line IV IV, Fig. II.

Referring to the drawings, 1 represents the outer wall or setting of the furnace.

2 represents the fire-box, and 3 the bridge-wall. I prefer to make the bridge-wall hollow and place therein a feed-water heater, of which 4 represents the shell and 5 the pipe for carrying the hot water from the heater to the boiler. The heater may be made in accordance with the construction shown and described in my application filed herewith, Serial No. 362,502; but so far as this application is concerned it is sufficient that it consists of a shell 4, a pipe 5, leading from the shell to the boiler, and flues 6, which traverse the shell and communicate with openings 7 in the bridge-wall, so that a portion of the heat and products of combustion will pass through the flues 6, heating the water in the shell before it passes to the boiler, and the gases that pass through the flues 6 will be ignited by the flames passing over the bridge-wall and be consumed in the combustion-chamber 8 back of the bridge-wall. The boiler 9 has a front water-leg 10 and a rear water-leg 11, which extend directly from the bottom of the boiler some distance down into the combustion-chamber of the furnace, as shown in Fig. I. The inner walls of these legs are connected by tubes 12, through which the water circulates from one leg to the other. The legs 10 11, it will be seen, form with the boiler

9 a chamber closed at top and both ends, which concentrates the heat on the bottom of the boiler and the water-tubes 12, and by such arrangement it will also be seen that the rear water-leg 11 is impinged directly by the flying products of combustion, which are compelled to strike it and then pass around under it. The heat and products of combustion passing over the bridge-wall come in contact with these tubes, as shown by the arrow in Fig. I, and heat the water in the boiler.

13 represents flues connecting the outer wall of the rear leg to the outer wall of the front leg, and which form a communication between a chamber 14 at the back of the boiler and the breeching 15 of the boiler. Each one of these flues preferably passes through one of the tubes 12, as shown in Fig. II, and through them passes a portion of the heat and products of combustion from the chamber 14 to the breeching 15, which facilitates the heating of the water which fills the spaces 16 between the tubes and the flues, the interior diameter of the tubes being greater than the exterior diameter of the flues.

17 represents flues traversing the body of the boiler above the water-legs, and through these flues a portion of the heat and products of combustion passes, as shown by the arrow in Fig. I, still further heating the water which surrounds the flues within the boiler.

18 represents partitions of fine clay or other suitable material, which I prefer to place between the lower part of the boiler and the setting of the furnace, as shown clearly in Figs. II and IV. These partitions are extended, as shown in Figs. III and IV, to close the spaces between the upper parts of the water-legs and the setting of the furnace. One of the partitions is partly removed in Fig. IV.

19 represents flues through the rear water-leg above the partition 18, through which part of the heat and products of combustion passes from the chamber 14 into the space above the partitions, and from the space the heat, &c., passes through flues 20 in the upper part of the front water-leg into the breeching 15. The partitions and flues 19 and 20 insure the circulation of a certain amount of heat over the upper part of the boiler, keeping the steam dry and highly heated.

21 represents beams arranged on top of the setting and from which the boiler is suspended by links or straps 22, as shown in Figs. II and III, the boiler being thus suspended in space within the setting and exposed to the heat on all sides. I prefer to have the pipe 5 deposit the water into a pan 24, (see Fig. I,) arranged within the boiler near its front end. From the pan 24 the water overflows into a pan 25, and from the latter it is carried through a pipe 26 to a pan 27, arranged within the boiler near its rear end. From the pan 27 the water overflows into a pan 28, and from this pan it is carried through pipes 29 to near the bottom of the rear water-leg, where it is discharged into the boiler and commences its circulation therethrough. The steam is removed from the boiler through a pipe 30, or an ordinary steam-drum may be used.

I claim as my invention—

1. In combination with a boiler and a furnace having a hollow bridge-wall having openings 7, a feed-water heater located in said bridge-wall and having flues 6, communicating with opening 7 in the bridge-wall, substantially as and for the purpose set forth.

2. The combination of a furnace, a boiler having water-legs connected to both ends of the boiler and extending directly from its bottom downward, tubes connecting the inner walls of the legs beneath the body of the boiler and above the bridge-wall of the furnace, and flues connecting the outer walls of the legs, the space between said water-legs being unobstructed throughout the whole extent of the said tubes, substantially as and for the purpose set forth.

3. The combination of a furnace, a boiler having water-legs forming, respectively, a part

of each end of the boiler and each being in direct communication with its respective end, tubes connecting the inner walls of the legs beneath the body of the boiler and over the bridge-wall of the furnace, and flues connecting the outer walls of the legs and passing through said tubes, substantially as and for the purpose set forth.

4. The combination, with the furnace, the combustion-chamber, and chamber 14, of a boiler arranged above said furnace, the partitions 18, extending throughout the length of the boiler, water-legs extending above and below said partitions, and flues leading through said water-legs above said partitions, substantially as set forth.

5. The combination of a furnace having a chamber 14, a boiler having water-legs and a breeching 15, flues 13 and 19, passing through the water-legs and forming a communication between said chamber and breeching, flues passing through the body of the boiler and forming a communication between said chamber and breeching, and the partitions 18, arranged below the flues 19 and extending throughout the length of the boiler, substantially as and for the purpose set forth.

6. In a boiler having a water-leg, the receiving-pan 28 and pipes 29, for carrying the water from the pan to the bottom of the leg, substantially as set forth.

7. In a boiler having a water-leg, pans 24 and 25, pipe 26, pans 27 and 28, and pipes 29, arranged and operating substantially as and for the purpose set forth.

WALLACE A. MORSE.

In presence of—

E. S. KNIGHT,
A. M. EBERSOLE.