No. 669,147. Patented Mar. 5, 1901.

H. A. ROBINSON.

STEAM BOILER.

(Application filed June 8, 1900.)

(No Model.)

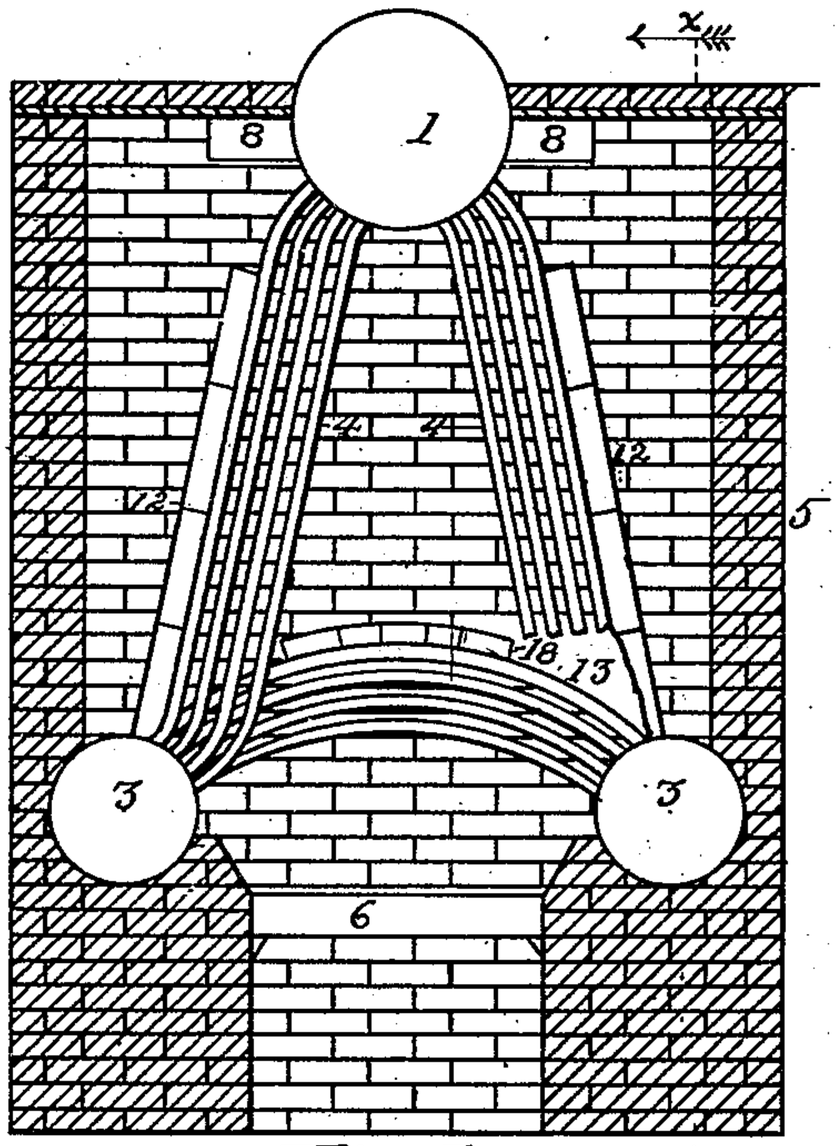

Fig. 1.

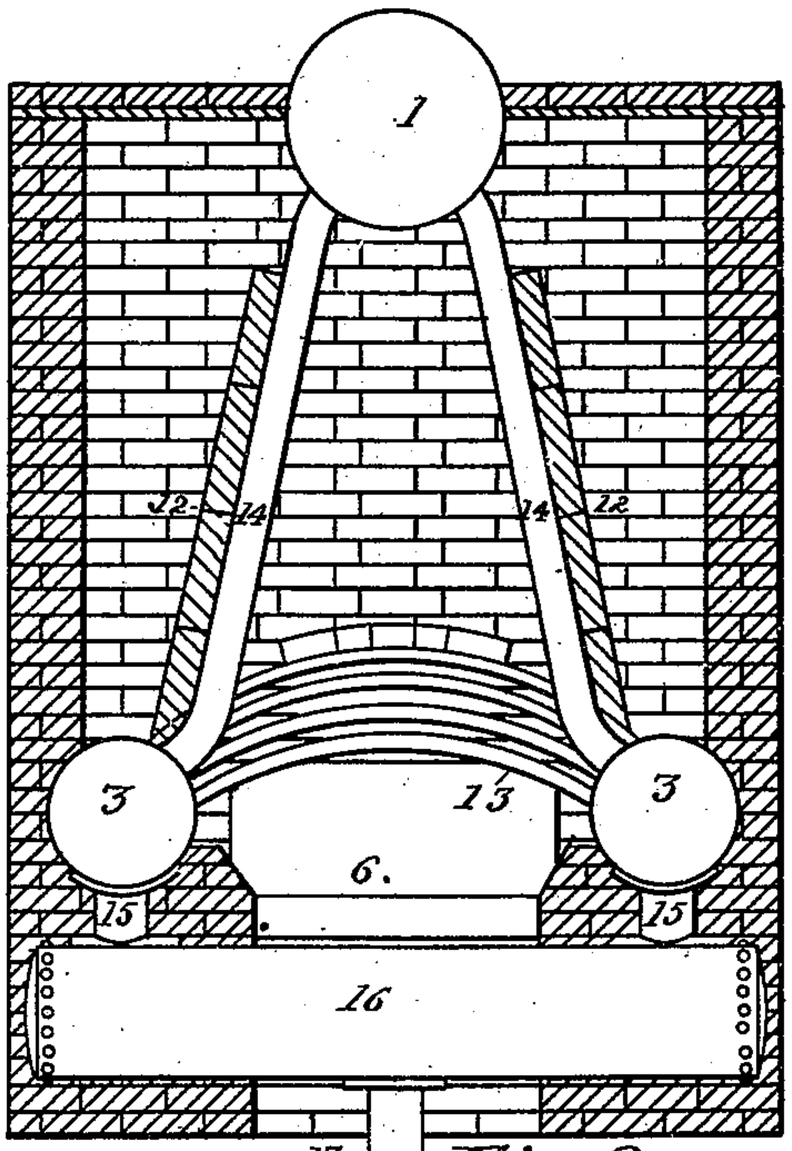

Fig. 2.

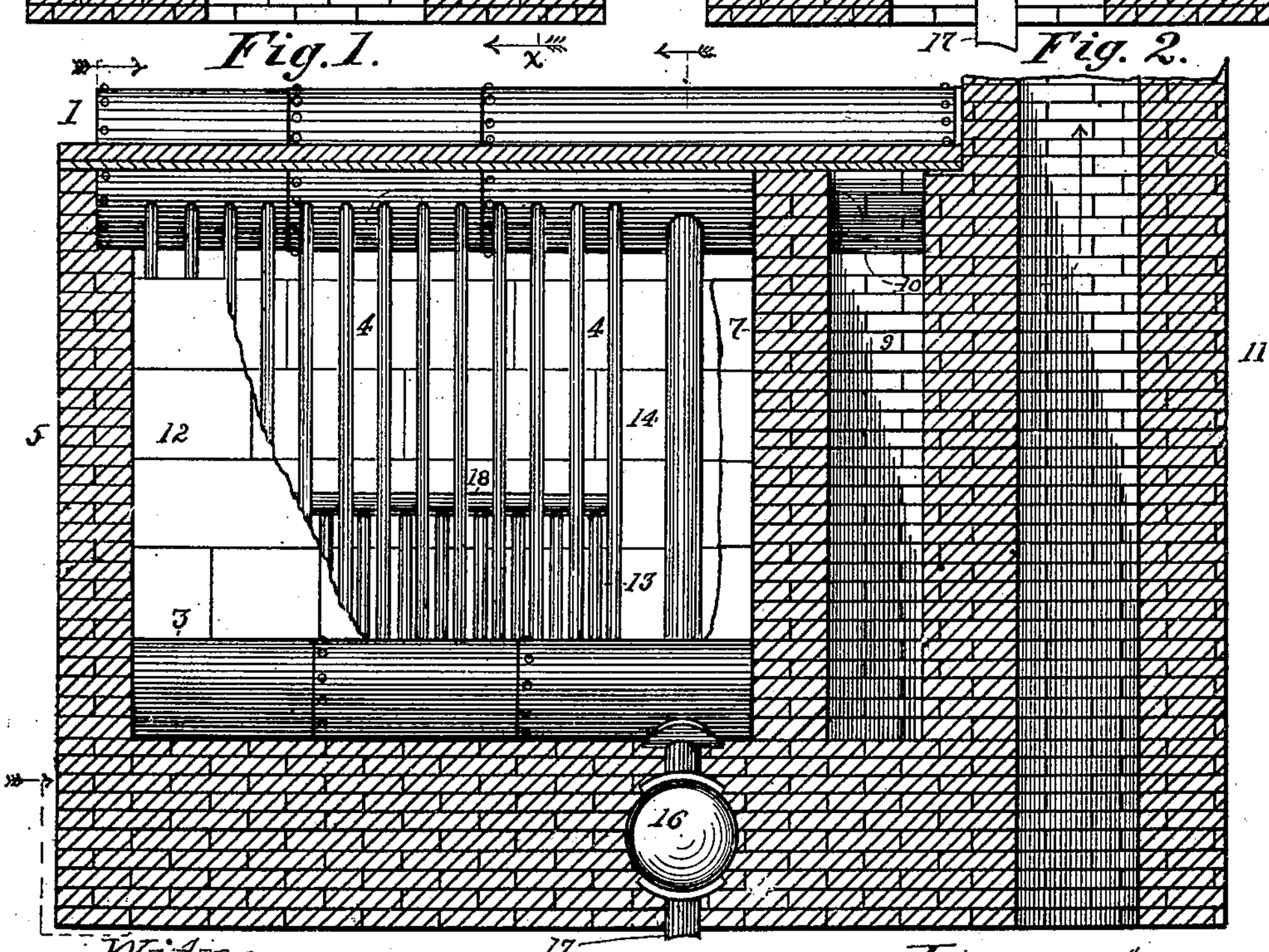

Fig. 3.

Witnesses:
Bessie Crook.
A. S. Alexander

Inventor:
Henry A. Robinson,
by Humphrey & Humphrey, Attys.

UNITED STATES PATENT OFFICE.

HENRY A. ROBINSON, OF AKRON, OHIO.

STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 669,147, dated March 5, 1901.

Application filed June 8, 1900. Serial No. 19,635. (No model.)

To all whom it may concern:

Be it known that I, HENRY A. ROBINSON, 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 Steam-Boilers, of which the following is a specification.

My invention has relation to improvements in that class of steam-boilers in which a central horizontal drum is connected with two lower drums located on opposite sides and below it by means of a series of tubes extending diagonally between them, and of which the patent to Joseph Firmenich and George Firmenich, No. 210,312, of November 26, 1878, is a type.

The objects of my invention are to increase the evaporative surface and consequent heating capacity of the boiler by means of cross-tubes connecting the lower drums which shall be immediately above and exposed to the direct heat of the furnace, to provide improved means for conveying the impurities from the water to the mud-drum, to so arrange the mud-drum as to receive all such deposit below the lower drums to the end that it may be more effectively removed, and to increase the circulation in the boiler.

To the aforesaid objects 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 views, Figure 1 is a front elevation of my improved boiler set in a suitable furnace; Fig. 2, a rear elevation of the same, and Fig. 3 a side elevation with the furnace partially in section at the lines $x\,x$ of Figs. 1 and 2.

Referring to the figures, 1 is the upper central drum, provided with a steam-dome 2, and 3 3 the lower drums, connected with the upper drum by a series or ranks of tubes 4, the whole inclosed and supported in a brickwork furnace 5, provided with a grate 6, located below the lower lines of the side drums. The upper drum 1 is longer than the lower drums 3 and at the back end is supported by a fire-wall 7, provided with openings 8 on either side, through which the products of combustion pass into an ash-chamber 9, and thence through an opening 10 into the chimney 11.

On each side of the ranks of tubes 4 are placed slabs of fireproof material 12 to retain the heat and complete the combustion-chamber.

Extending between the lower drums 3 3 above the location of the fire and preferably curved upward in the center are a series of tubes 13, inserted in the drums 3 3 in such manner as to alternate with the tubes 4. These may be ranks of single tubes, but are preferably of four or more ranks, the size of the lower drums and the requirements of the boiler being regarded in determining their number, and they may extend nearly the length of the lower drum; but a shorter distance will ordinarily be found to secure the proper amount of heating and circulation.

Back of the ranks of tubes 4 are pipes 14, connected at their upper ends with the lower part of the upper drum 1 and extending downward and united with the rear ends of the lower drums 3, the object and purpose of which is to convey any sediment from the upper to the lower drums.

Transversely across the furnace and below the back ends of the lower drums and connected with them by pipes 15 is a mud-drum 16, provided with a blow-off pipe 17, regulated by a valve. (Not shown.)

To insure distribution of the heat from the furnace along the side pipes 4 4, there is placed on the tubes 13 a layer 18, of brick or like material, that extends as far back as these tubes and covers their centers nearly to each side, thus constituting a baffle-bridge to deflect the heat laterally in each direction, as indicated by the arrows.

I claim as my invention—

1. An improved boiler consisting of one upper horizontal drum, and two horizontal lower drums at the sides of said upper drum, with ranks of tubes connecting the upper drum with the lower drums; tubes extending between and connecting the lower drums, and a mud-drum situated below, transverse to and connected with said lower drums, substantially as shown and described.

2. An improved boiler consisting of an up-

per horizontal drum, and two horizontal lower drums, with ranks of tubes connecting the upper drum with the lower drums and cross-tubes connecting the lower drums; and two independent larger tubes connecting the upper with the lower drums to convey sediment from the former to the latter and a mud-drum situated below transverse to and connected with said lower drums substantially as shown and described.

3. The combination with a boiler consisting of an upper horizontal drum and two lower horizontal drums, said upper and lower drums being connected by ranks of pipes, and said lower drums connected by cross-pipes and a mud-drum situated below transverse to and connected with said lower drums, and an inclosing furnace, of a layer of fireproof material on said cross-pipes extending nearly to the lower drums on each side, substantially as shown and described.

In testimony that I claim the above I hereunto set my hand in the presence of two subscribing witnesses.

HENRY A. ROBINSON.

In presence of—

C. P. HUMPHREY,

C. E. HUMPHREY.