

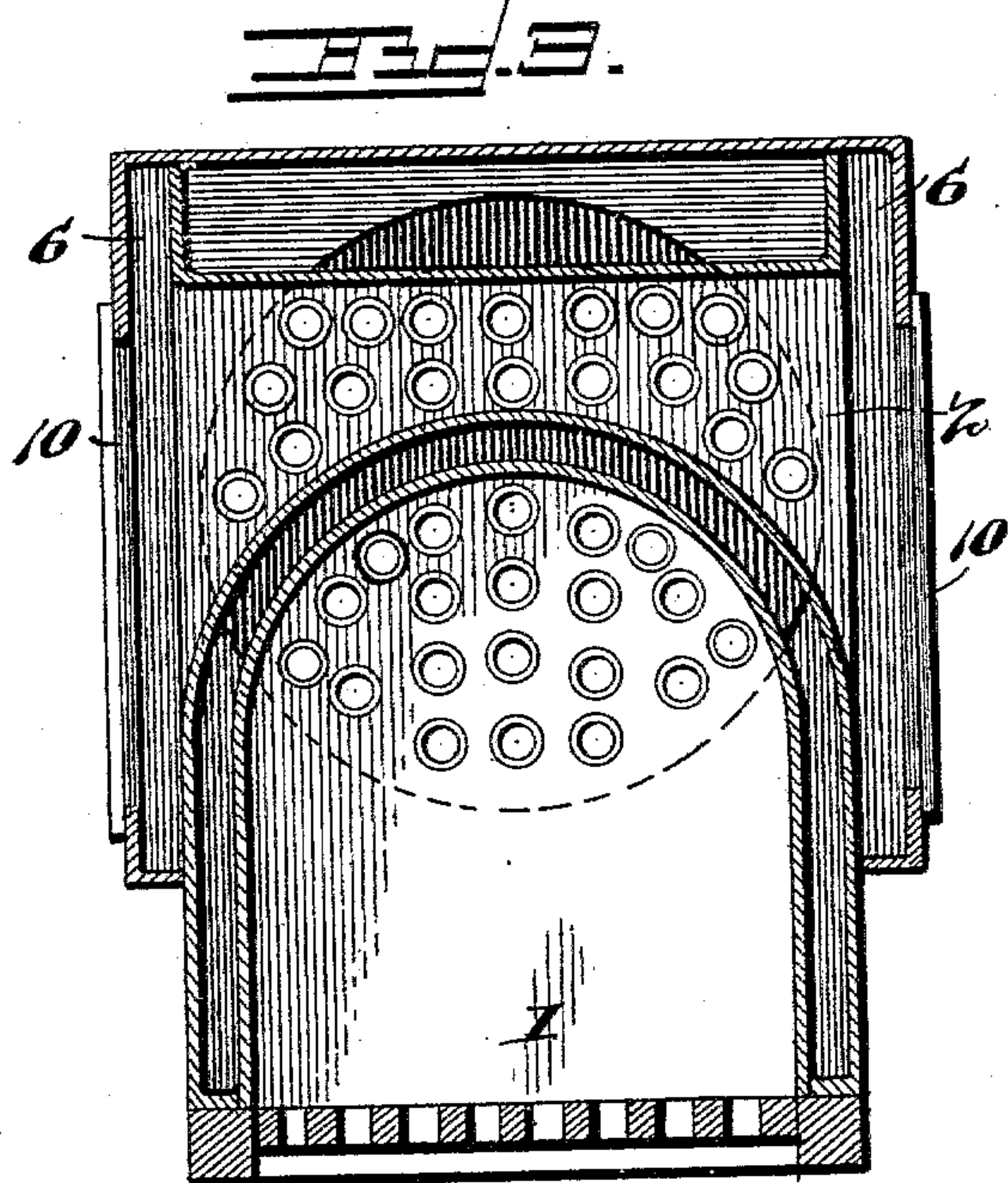
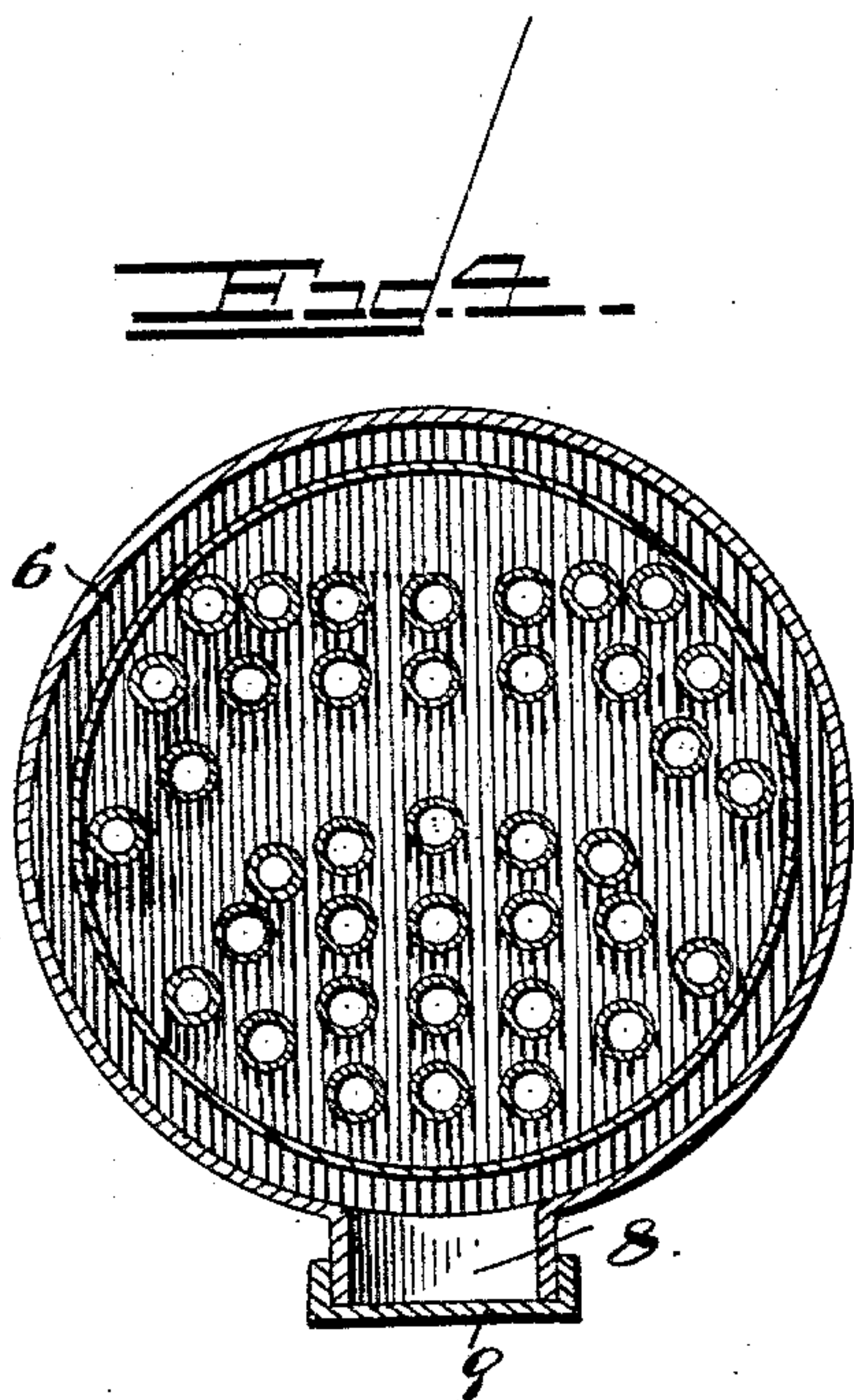
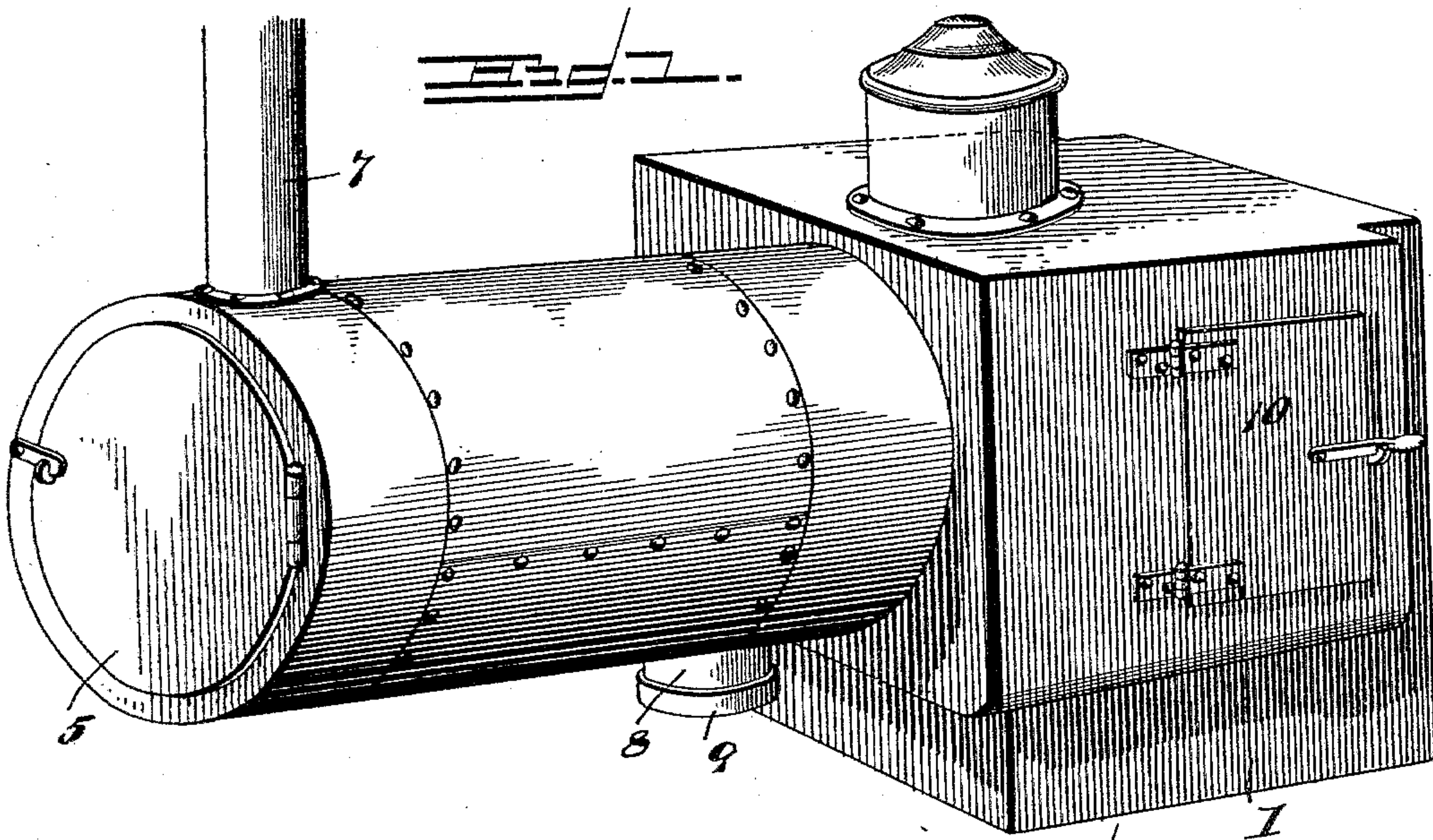
(No Model.)

2 Sheets—Sheet 1.

C. C. HANSEN.
BOILER.

No. 597,498.

Patented Jan. 18, 1898.



Inventor
Christopher Hansen

Witnesses

E. S. Stewart
U. B. Hillyard

By *W. S. Atterbury* Attorneys,

C. A. Snow & Co.

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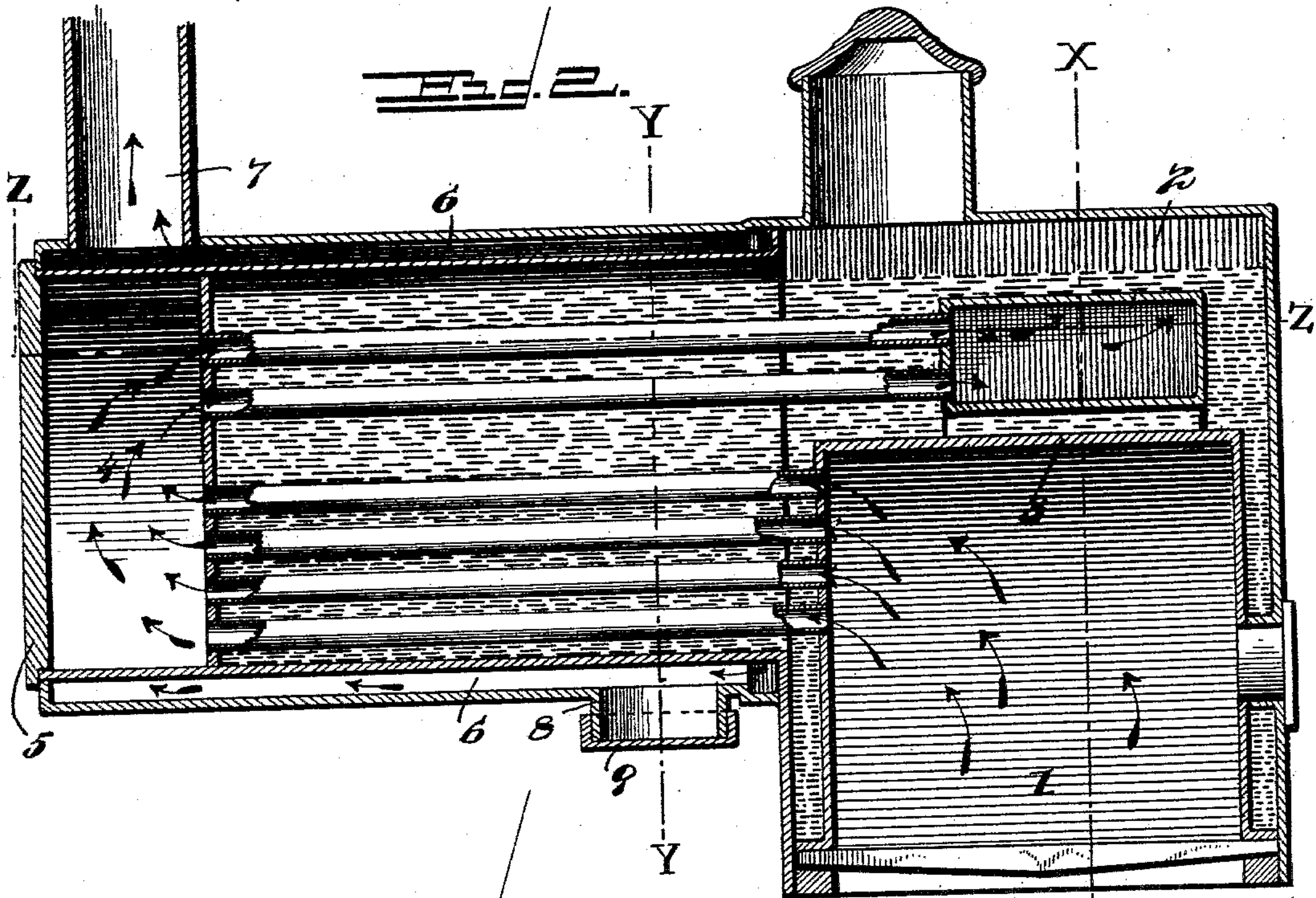


Fig. 2.

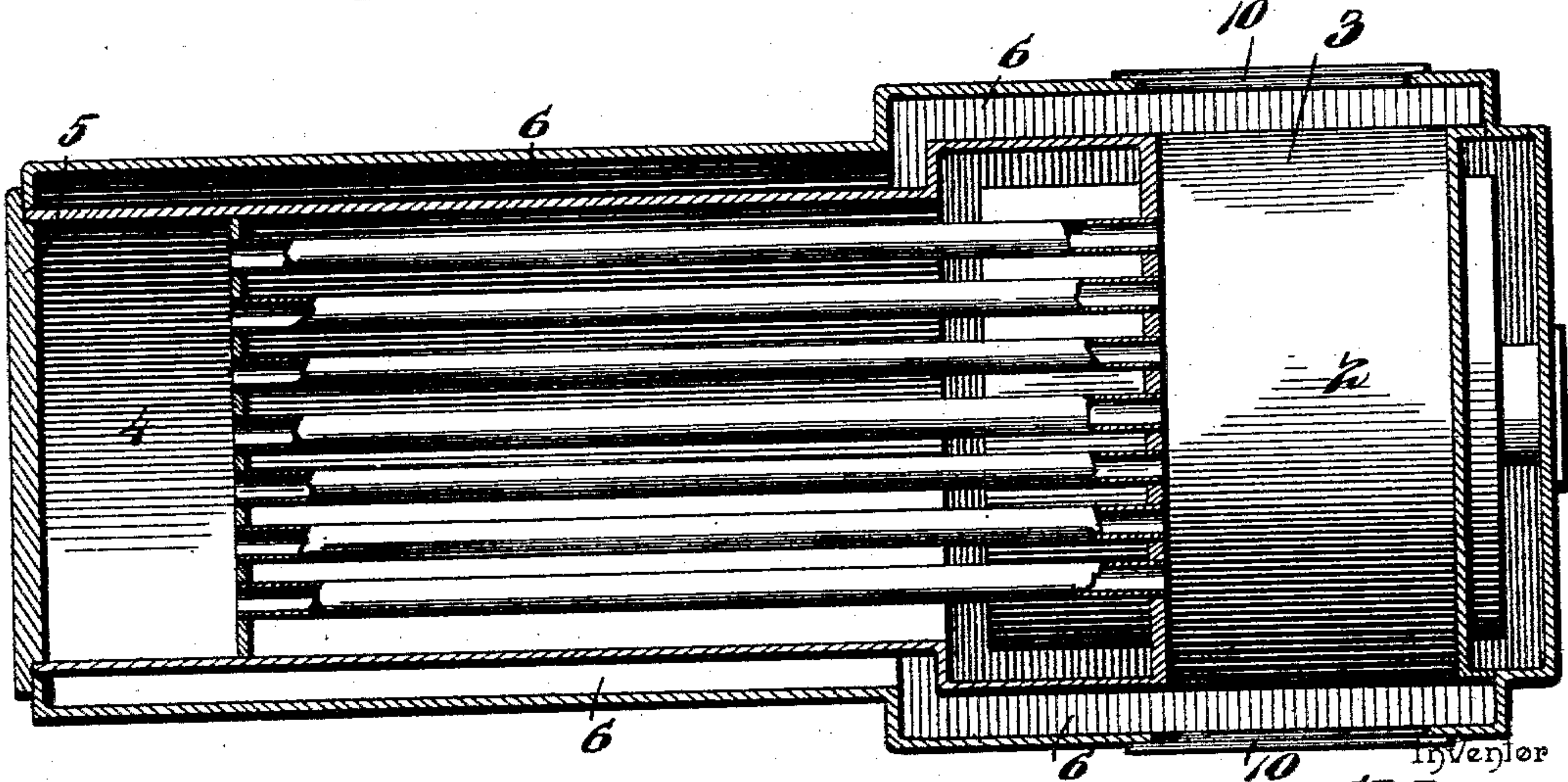


Fig. 5.

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UNITED STATES PATENT OFFICE.

CHRISTOPHER C. HANSEN, OF CARROLL, MONTANA, ASSIGNOR OF ONE-THIRD TO JACOB HANSEN, OF RANDOM LAKE, WISCONSIN.

BOILER.

SPECIFICATION forming part of Letters Patent No. 597,498, dated January 18, 1898.

Application filed June 11, 1897. Serial No. 640,363. (No model.)

To all whom it may concern:

Be it known that I, CHRISTOPHER C. HANSEN, a citizen of the United States, residing at Carroll, in the county of Deer Lodge and State of Montana, have invented a new and useful Boiler, of which the following is a specification.

This invention relates to boilers, and is designed to economize fuel by preventing the loss of heat by radiation and to cause the gases, hot air, and products of combustion to travel in contact with a greater extent of surface than is possible with boilers as generally constructed. Incidental to the construction provision is had for arresting sparks and cinders, which is of vital consequence in firing the furnaces connected with the boilers to the safety of surrounding structures and to the convenience and comfort of individuals.

A further purpose of the invention is to prevent explosion and the burning out of the crown-sheet in the event of the water falling below a predetermined level, as the upper tubes will collapse before possible harm can happen to the crown-sheet, which latter can be replaced only at considerable expense and a shutting down of the boiler for a number of days, whereas the smoke-tubes can be replaced at a comparatively slight cost and short time.

Various other objects and advantages will appear in the course of the subjoined description and are contemplated within the nature and scope of the invention, and for a full understanding of the merits and advantages of the invention reference is to be had to the accompanying drawings and the following description.

The improvement is susceptible of various changes in the form, proportion, and the minor details of construction without departing from the principle or sacrificing any of the advantages thereof, and to a full disclosure of the invention an adaptation thereof is shown in the accompanying drawings, in which—

Figure 1 is a perspective view of a boiler constructed in accordance with this invention. Fig. 2 is a central longitudinal section thereof. Fig. 3 is a transverse section on the line X X of Fig. 2. Fig. 4 is a similar sec-

tion on the line Y Y of Fig. 2. Fig. 5 is a plan section on the line Z Z of Fig. 2.

Corresponding and like parts are referred to in the following description and indicated in the several views of the accompanying drawings by the same reference-characters.

The boiler is of the locomotive or horizontal type and is provided with a bank of tubes and a fire-box 1 at one end surrounded by a water-jacket in the usual manner. A smoke-chamber 2 is located above the front portion of the fire-box and is separated therefrom by an arched wall 3, which is hollow and in communication at its ends and sides with the water-space surrounding the fire-box and connecting with the interior of the boiler. A smoke-compartment 4 is formed at the rear of the boiler and wholly in the rear of the bank of tubes and is accessible by means of a door 5 at the rear end of the boiler.

A jacket is applied to the boiler proper and completely encircles it, forming a space 6, through which the gases, hot air, and products of combustion pass. This jacket is extended along the sides of the fire-box, providing a continuation of the space 6, as clearly indicated in the several sectional views. The smoke-stack 7 connects with the jacket at the rear end, and a collar 8 is fitted to the lower side of the jacket immediately in the rear of the fire-box and is closed by a cap 9, which when opened admits of cinders, soot, ashes, and other accumulations being readily removed. The sides of the fire-box opposite the smoke-chamber 2 are formed with openings which are closed by doors 10, through which the interior of the smoke-chamber can be reached for cleaning, inspecting, making repairs, or for any desired purpose.

When the fire is lighted and the boiler is in operation, the smoke, gases, and products of combustion are deflected through the lower tubes of the series by means of the arched wall 3 and enter the smoke-compartment 4, and return to the fire-box through the upper set of tubes and enter the smoke-chamber 2, and pass thence into the space 6, surrounding the boiler, and at the sides of the fire-box and escape through the smoke-stack. It will thus be seen that an extended surface is presented to extract all the heat available from the prod-

ucts of combustion in their passage around and through the boiler in the manner set forth, thereby utilizing a maximum amount of the heat for heating the water in the boiler.

5 Having thus described the invention, what is claimed as new is—

1. In a boiler of the locomotive type, the combination of a fire-box having spaces at its sides, a jacket encircling the boiler and providing a space which is in communication with the spaces at the sides of the fire-box, a smoke-stack having connection with the rear portion of the space inclosed by the jacket and surrounding the boiler, a smoke-compartment at the rear end of the boiler, a smoke-chamber above the fire-box and in communication at its ends with the said spaces at the sides of the fire-box, an upper set of tubes connecting the smoke-chamber with the smoke-compartment, and a lower set of tubes connecting the upper portion of the fire-box with the lower portion of the smoke-compartment, substantially as set forth.

2. In a boiler of the locomotive type, the combination of a fire-box surrounded by a water-jacket and having spaces at its sides exterior to the water-jacket, a jacket enveloping the boiler and in communication with the said sidespaces, and having a normally-closed opening at its lowest side, a stack in connection with the rear end of the jacket, a smoke-chamber located directly above the fire-box within the water-space and having its ends connecting with the aforesaid spaces at the

sides of the fire-box, a smoke-compartment at the rear end of the boiler, and tubes connecting the upper portion of the fire-box with the lower portion of the smoke-compartment and the upper portion of the latter with the smoke-chamber, substantially as shown for the purpose set forth.

3. In a boiler of the locomotive type, the combination of a fire-box surrounded by a water-space, a hollow arch extending over the combustion-chamber and in communication with the water-space, a smoke-chamber located directly above the combustion-chamber and in communication with spaces at the sides of the fire-box, a smoke-compartment at the rear end of the boiler, a lower set of tubes connecting the combustion-chamber with the smoke-compartment, an upper set of tubes connecting the smoke-compartment with the smoke-chamber, a jacket forming a space around the boiler and having connection with the spaces at the sides of the fire-box, and provided at its lower end with a normally-closed opening, and a smoke-stack applied to the rear portion of the said jacket, substantially as described.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

CHRISTOPHER C. HANSEN.

Witnesses:

CHRISTOPHER J. HEALY,
D. H. MORONY.