

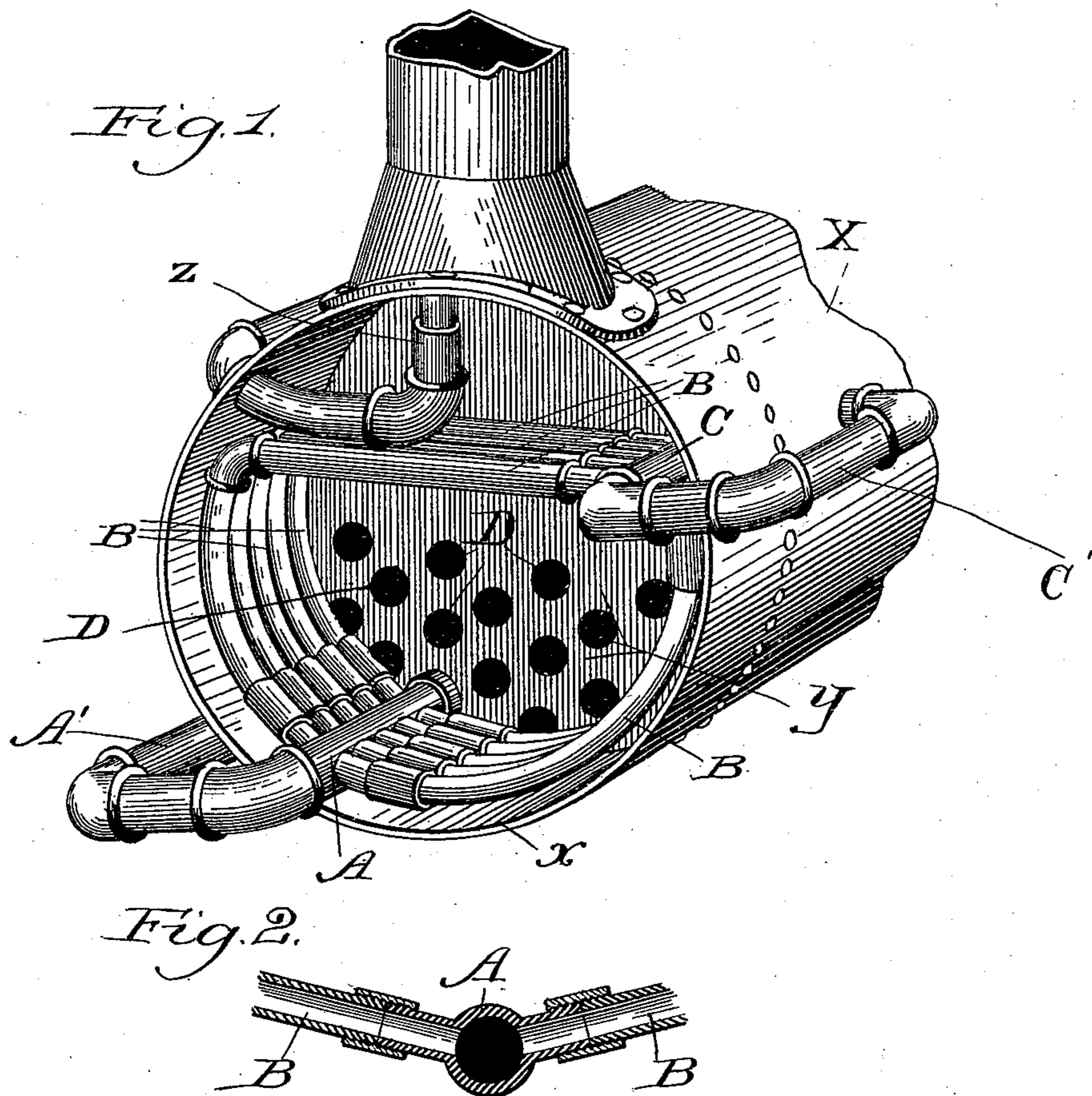
(No Model.)

G. H. SUTHERLAND.

STEAM BOILER.

No. 355,665.

Patented Jan. 4, 1887.



Witnesses:
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UNITED STATES PATENT OFFICE.

GEORGE H. SUTHERLAND, OF WALLA WALLA, WASHINGTON TERRITORY.

STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 355,665, dated January 4, 1887.

Application filed November 13, 1886. Serial No. 218,780. (No model.)

To all whom it may concern:

Be it known that I, GEORGE H. SUTHERLAND, a citizen of the United States, residing at Walla Walla, in the county of Walla Walla, Washington Territory, have invented certain new and useful Improvements in Steam-Boilers, of which this specification, in connection with the drawings accompanying it, is a full and complete description, sufficient to enable those skilled in the art to which it appertains to construct the same.

My invention applies to all boilers where the heated products of combustion passing through a horizontal cylinder are brought in contact with metal pipes or flues containing or surrounded by water for the purpose of heating such water or converting the same into steam, and more particularly applies to that class of steam-generating boilers wherein the outer shell or case extends beyond the boiler and flues, forming a chamber in which the products of combustion from the fire-box in a more or less heated condition are discharged immediately before their final exit through the chimney, or in the case of "return-flue boilers," so called, immediately before their passage into and through said return-flues; and the object of my invention is to introduce into said horizontal cylinder or chamber such additions and improvements as will to a large extent utilize the heat passing through such horizontal cylinder or contained in said chamber.

I have illustrated my invention by the drawings accompanying this specification and forming a part hereof, in which—

Figure 1 is a perspective view of my invention applied to the chamber formed in an ordinary horizontal cylinder-boiler by the extension of the shell or case beyond the flues therein. Fig. 2 is a cross-section of the distributing-chamber of my invention and the pipes connected thereto.

Like letters refer to like parts throughout the several views.

X is the shell or case of the boiler.

Y is the chamber formed by the continuation of the shell or case beyond the flues.

Z is the exhaust.

A is a chamber formed of wrought or cast iron, communicating by pipe A' with the water in the boiler, and also communicating by

pipes B B with chamber C. Chamber C is connected with the boiler X by pipe C'.

Chamber A is termed by me the "distribution-chamber," as the water entering therein through pipe A' is distributed from said chamber A to and into the several pipes B B. Pipes B B, from the point of connection with distributing-chamber A, are curved to fit more or less closely the inner surface of chamber Y, the precise amount of such curve being controlled to a large extent by the form of chamber Y, those pipes B B leaving the distributing-chamber A on the right of said chamber curving to at or near the point of their connection with chamber C, and those pipes B B leaving distributing-chamber A on the left side of said chamber curving to a point at or near the level of chamber C, from which point they extend practically horizontally to the point of their connection with said chamber C.

Chamber C is, as before described, connected with pipes B B, and serves as a chamber in which the water or other contents of said pipes are collected. From collecting-chamber C connection is made with the boiler by a pipe, C'.

The precise number of pipes B B is not material, although it is evident that the greater the number of said pipes the larger the amount of surface exposed to the action of the heated contents of chamber Y. An inspection of pipes B B, and particularly that portion of the pipes which lies horizontally, as before described, shows that said pipes must necessarily be placed a sufficient distance apart to allow of the free circulation of the contents of chamber Y, in the case of a boiler constructed in the manner illustrated by the drawings herein, in order to allow the passage of the contents of said chamber between said pipes and into the chimney or other exit therefor; but in the case of a return-flue boiler pipes B B may be placed as closely together as may be desired, the contents of said chamber having access to the return-flues without having to pass between said pipes.

That portion of pipes B B arranged horizontally, as well as collecting-chamber C, are below the water-line in the boiler to which my invention is attached.

The manner of operation of my invention is as follows: The boiler is filled with water

to the water-line, and the water from the boiler enters distributing-chamber A, through pipe A', from the boiler, and from said chamber A enters pipes B B, passing through said pipes 5 to and into collecting-chamber C, and from said chamber C, through pipe C', back into the boiler. Pipe A' is attached to the boiler near the lower or under side, while pipe C' is attached to the boiler but a short distance below the water-line in said boiler. The fire is then started in the fire-box, and the heated products of combustion from the combustion-chamber pass through flues D D in the form of boiler here illustrated, and to which form alone I have thus far practically applied my invention, into the chamber Y, where the same are brought in contact with chambers A C and pipes B B, heating the contents thereof, after which in a more or less cooled condition 20 from such contact the said products of combustion are allowed to leave chamber Y by the chimney. Where my invention is applied to a return-flue boiler the heated products of combustion pass from the combustion-chamber through the large central flue or pipe used in such boilers into chamber Y, and, after contact in the manner above described with chambers A C and pipes B B, pass from said chamber Y into and through the return flues. 30 The application of heat in the manner just referred to in chamber Y to chambers A C and pipes B B raises the temperature of the water contained therein, and a rapid circulation of the contents thereof is thereby caused, the heated water being discharged from collecting-chamber C back into the boiler through pipe or connection C'.

By the form of construction adopted by me the heated portion of the water contained in 40 chamber A and pipes B B is in no case forced to descend, and no resistance is offered to the free and rapid circulation of the contents of chamber A and pipes B B, and the heated water collected in chamber C is freely discharged into that portion of the boiler containing water of about the same or greater 45 temperature as said contents of chamber C.

Having thus described my invention, its construction, and method of operation, what I claim, and desire to secure by Letters Patent, 50 is—

1. In a steam-boiler, the combination of a distribution-chamber connected with the lower or under side of the horizontal cylinder forming such boiler, pipes leading from said distribution-chamber to a collection-chamber, 55 said collection-chamber connected with said horizontal cylinder at or near the water-line thereof, the said distribution-chamber, collection-chamber, and pipes connecting them being exposed to the heated products of combustion from the fire-box and combustion-chamber in the chamber formed by the extension of the outer shell or case of the said horizontal cylinder beyond the boiler and flues, 65 all substantially as described, and for the purpose set forth.

2. In a steam-boiler, the combination of a distribution-chamber connected with the lower or under side of the horizontal cylinder forming such boiler, pipes leading from and connecting such distribution-chamber with a collection-chamber, said collection-chamber connected with said horizontal cylinder at or near the water-line thereof, the said distribution-chamber, collection-chamber, and pipes connecting them being exposed to the heated products of combustion from the fire-box passing through the chamber formed by said distribution-chamber, collection-chamber, and 70 connecting-pipes, all substantially as described, and for the purpose set forth. 75

3. In a steam-boiler, the combination of boiler-shell X, chamber Y, pipe A', chamber A, pipes B B, chamber C, and pipe C', all substantially as described, and for the purpose set forth. 85

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