No. 685,178. Patented Oct. 22, 1901.

C. A. SAWIN.

BOILER OR STEAM GENERATOR.

(Application filed Apr. 3, 1901.)

(No Model.)

Fig. 1.

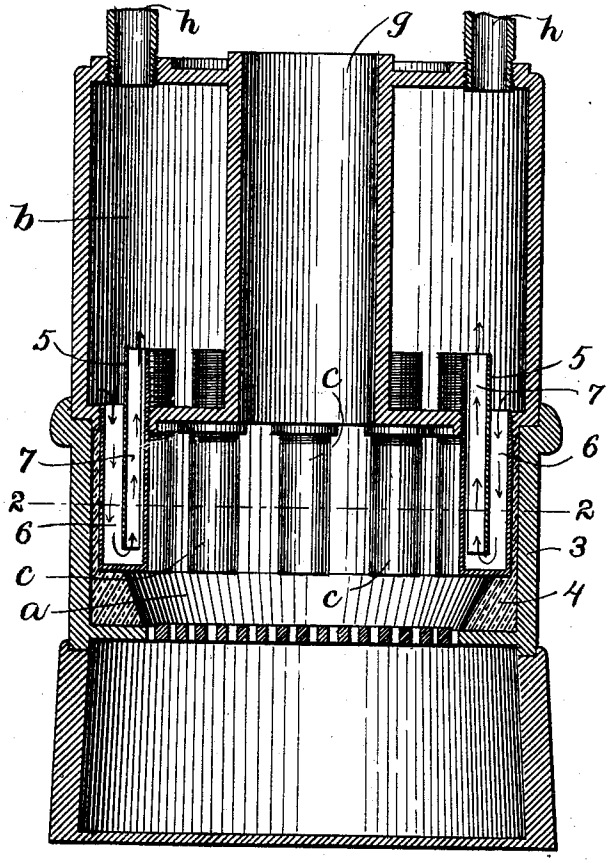


Fig. 3.

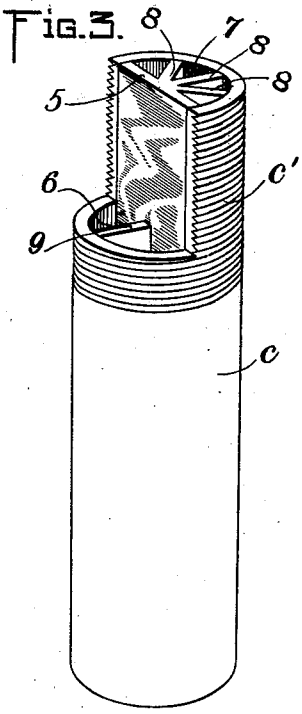


Fig. 2.

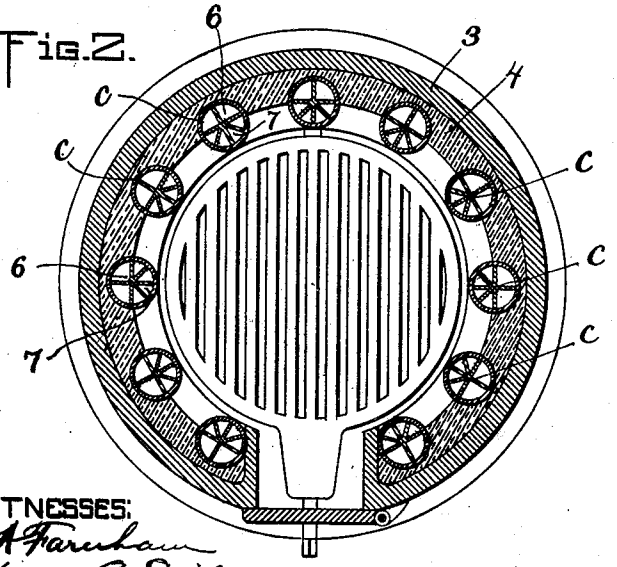
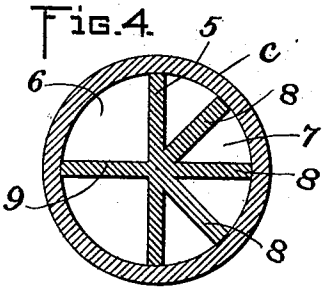


Fig. 4.



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UNITED STATES PATENT OFFICE.

CHARLES A. SAWIN, OF WALTHAM, MASSACHUSETTS.

BOILER OR STEAM-GENERATOR.

SPECIFICATION forming part of Letters Patent No. 685,178, dated October 22, 1901.

Application filed April 3, 1901. Serial No. 54,184. (No model.)

To all whom it may concern:

Be it known that I, CHARLES A. SAWIN, of Waltham, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Boilers or Steam-Generators, of which the following is a specification.

This invention relates to boilers or steam-generators for heating purposes; and it has for its object to provide for a rapid circulation of water in contact with large areas of heated surface to the end that the fuel in the fire-box or furnace may be utilized to the best advantage and that simplicity and efficiency of construction may be obtained.

The invention consists in the improvements which I will now proceed to describe and claim.

Of the accompanying drawings, forming a part of this specification, Figure 1 represents a vertical section of a boiler or steam-generator embodying my invention. Fig. 2 represents a section on line 2 2 of Fig. 1. Fig. 3 represents a perspective view of one of the drop-tubes removed. Fig. 4 represents a sectional view of said tube.

The same reference characters designate the same parts in all the figures.

In the drawings, *a* represents a fire-box, the wall of which is preferably circular and is composed of an outer shell 3 and a refractory lining 4.

b represents a steam and water dome, which is seated on the shell 3 and has inserted in its bottom a series of drop-tubes *c*. Each tube is internally divided by a longitudinal partition 5 into a descending flue or passage 6 and an ascending flue or passage 7, the lower ends of these passages communicating with each other below the partition 5, which terminates above the closed lower end of the tube *c*. The side of the tube which contains the ascending flue portion is extended upwardly above the side containing the descending flue portion, as clearly shown in Fig. 3, so that the upper end of the ascending flue portion is elevated above the upper end of the descending flue portion. The tube is externally screw-threaded at *c'*, the threaded portion being screwed into a tapped orifice in the bottom of the dome *b* until the upper end of the descending flue portion is substantially flush with the upper surface of said bottom, as shown in Fig. 1, the upper end of the ascending flue portion extending upwardly into the dome. This arrangement causes a much more effective and rapid circulation than would be the case if the upper ends of the two flues were on the same level.

The ascending flue portions of the several tubes are arranged so that their outer walls are exposed to the fire in the fire-box, the descending flue portions being at the rear sides of the ascending flue portions and between the latter and the wall of the fire-box. The lining portion 4 of said wall is preferably recessed, as shown in Fig. 2, so that it receives the descending flues of the drop-tubes and practically covers the same. It will be seen, therefore, that the ascending flues of the drop-tubes are exposed advantageously to the heat of the fire, while the descending flues are protected, so that the water flowing through them receives comparatively little heat. A rapid and effective circulation is thus insured.

I prefer to subdivide the ascending flue into a series of flues by means of partitions 8, as shown in Fig. 4. I find it advantageous to employ as many of these partitions 8 as can be arranged in the ascending flue without unduly filling the water-space therein. Heat is conducted from the exposed periphery of the tube to the partitions 8 and inwardly along said partitions, so that the water flowing through the ascending flue is exposed to large areas of heated surface. I find it desirable to provide a partition 9 in the descending flue, mainly for the purpose of supporting the partition 5 and preventing it from bulging into the descending flue. The several partitions above described may be made in a single casting, preferably of brass, or they may be made in separate pieces forced into the tube *c*. I prefer to force the partition 5 into the tube before the screw-thread *c'* is cut thereon, the width of the partition being such that it slightly expands the tube in the direction of the width of the partition, so that when the tube is subsequently threaded and screwed into the bottom of the dome it is firmly and securely held.

g represents a smoke-flue extending through the dome *b*, and *h h* are steam-pipes connected with the top of the dome.

I claim—

1. A boiler or steam-generator comprising a dome, a fire-box below the dome, and a series of drop-tubes each internally divided into a descending flue and an ascending flue, the outer walls of the ascending flues being exposed to the fire in the fire-box, while the descending flues are located between the ascending flues and the wall of the fire-box, and in contact with said wall.

2. A boiler or steam-generator comprising a dome, a fire-box below the dome, and a series of drop-tubes each internally divided into a descending flue and an ascending flue, the outer walls of the ascending flues being exposed to the fire in the fire-box, while the descending flues are located in recesses in the wall of the fire-box.

3. A boiler or steam-generator comprising a dome, a fire-box below the dome, and a series of drop-tubes each internally divided into a descending flue and an ascending flue, the outer walls of the ascending flues being exposed to the fire in the fire-box, while the descending flues are located between the ascending flues and the wall of the fire-box and in contact with said wall, the ascending flues extending above the upper ends of the descending flues.

4. A drop-tube having a main partition separating its interior into a descending and an ascending flue, subpartitions subdividing the ascending flue, and a brace in the descending flue for the main partition.

In testimony whereof I have affixed my signature in presence of two witnesses.

CHARLES A. SAWIN.

Witnesses:

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