

G. G. HUNT.
STEAM GENERATOR.

No. 69,215.

Patented Sept. 24, 1867.

Fig. 3.

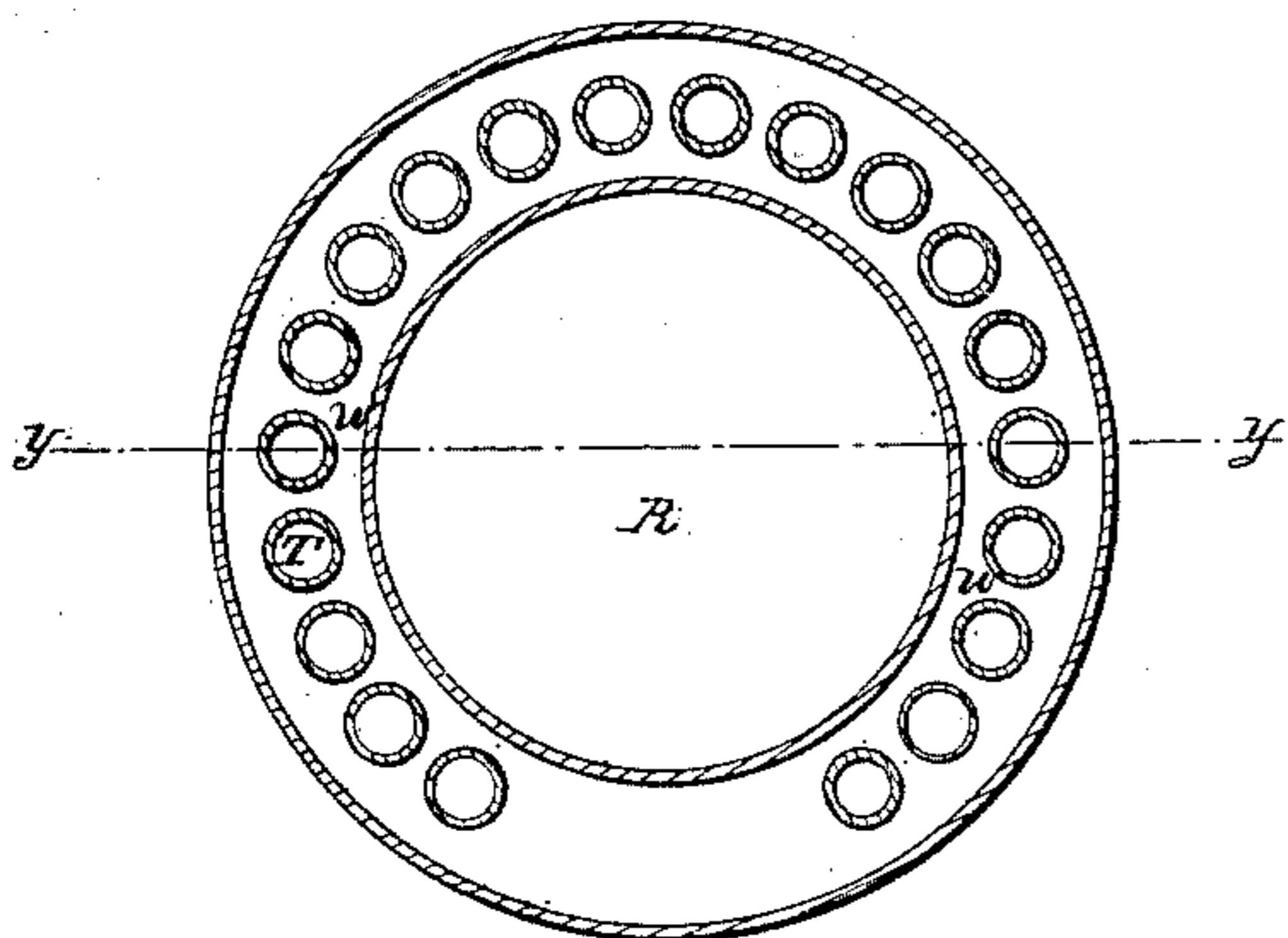


Fig. 2.

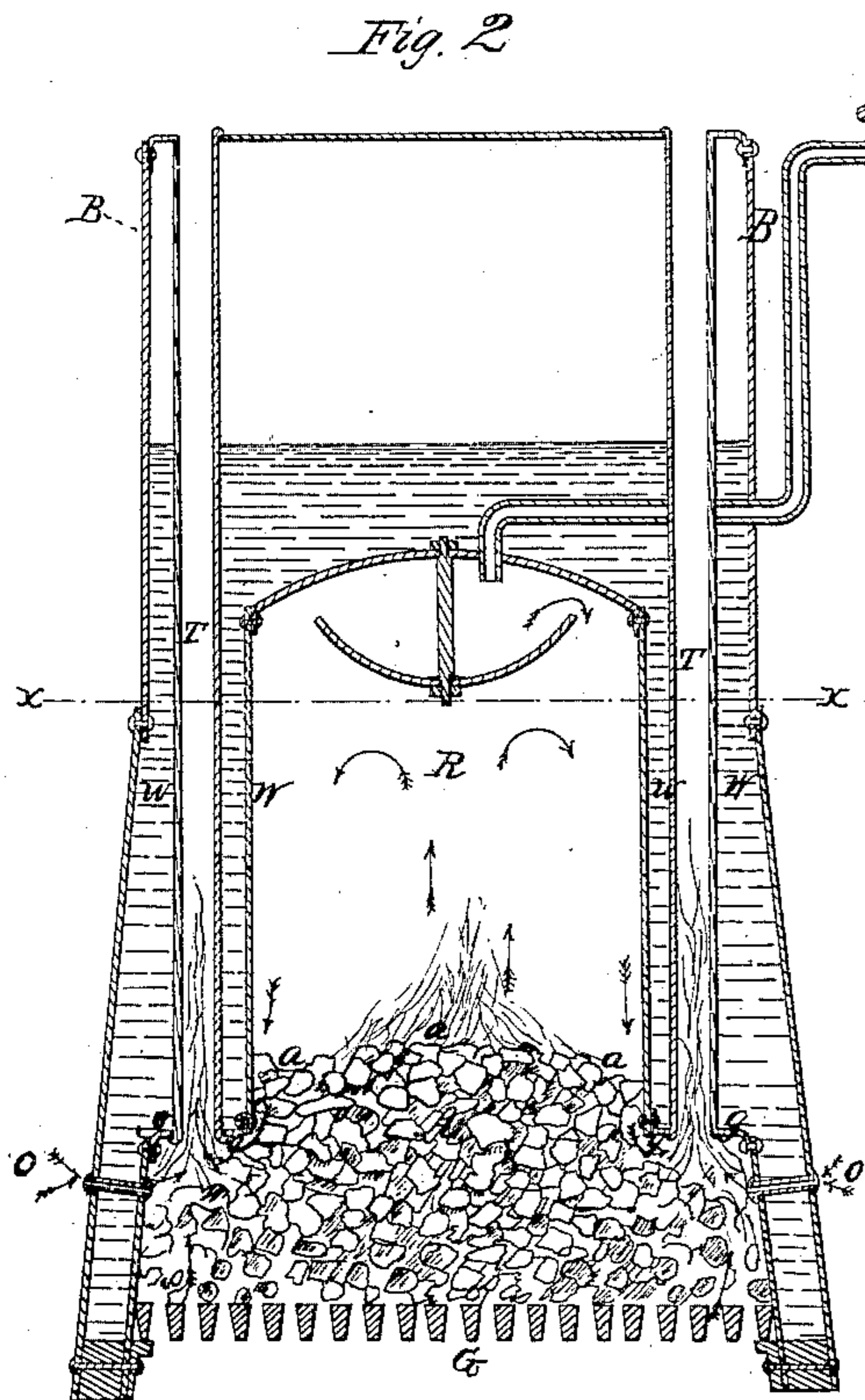
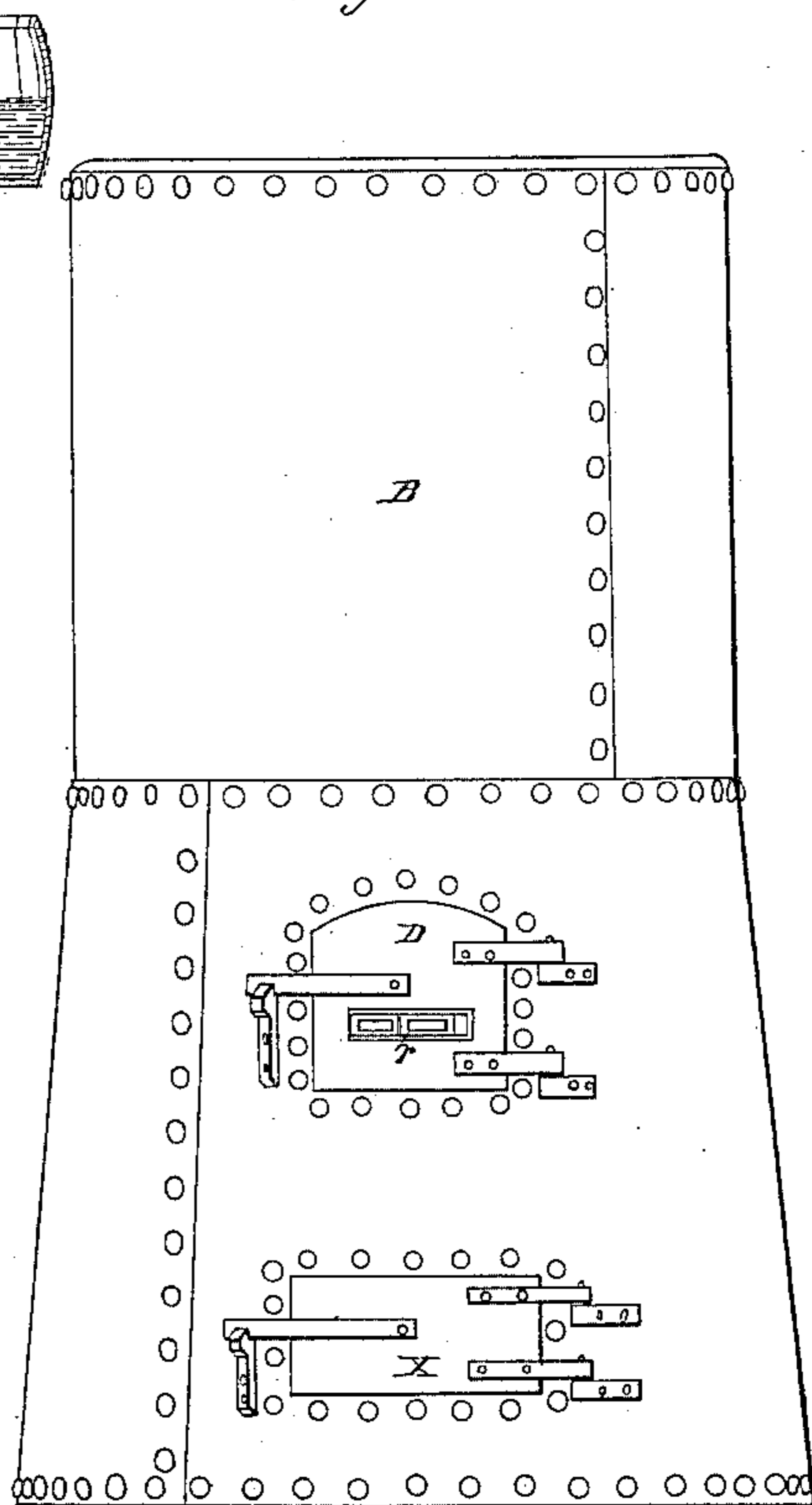


Fig. 1.



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GEORGE G. HUNT, OF BRIDGEPORT, CONNECTICUT.

Letters Patent No. 69,215, dated September 24, 1867.

IMPROVEMENT IN STEAM-GENERATORS.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, GEORGE G. HUNT, of Bridgeport, in the county of Fairfield, and State of Connecticut, have invented an Improvement in Steam-Boilers; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a front elevation of an upright steam-boiler having my invention applied to it.

Figure 2 is a diametrical section through the improved steam-boiler.

Figure 3 is a section through the boiler, taken in the horizontal plane indicated by red line *x x* in fig. 2.

Similar letters of reference indicate corresponding parts in the three figures.

This invention relates to an improvement in the construction of steam-boilers which are designed particularly for burning soft or bituminous coal.

The object of my invention is to so construct a steam-boiler that the heated gases and smoke arising from the body of coals in the fire-box shall be conducted into a reverberating-chamber, and from thence caused to descend and pass through a body of live or incandescent coals, at points which are below the level of the water in the boiler, and which are located at the lower ends of ascending flues leading through the boiler, thereby causing a perfect combustion of the gases and a saving of fuel, as will be hereinafter explained.

It also consists in the arrangement, within the outer shell of a steam-generator, of a series of ascending flues and a reverberating-chamber communicating with and arranged immediately over a fire-chamber, which is of greater superficial area than the said tubes and reverberating chamber, thereby causing a free direct draught up through the coals, which are directly beneath the ascending flues, and keeping these coals in an incandescent state, for the purpose of burning the gases which are generated in said reverberating-chamber, at the points of escape of these gases, and at the same time having a chamber of highly heated gas surrounded by the water in the boiler, as will be hereinafter described.

To enable others skilled in the art to understand my invention, I will describe its construction and operation.

In the accompanying drawings, B represents an upright boiler, which may be made of the cylindro-conical form shown, or of any other suitable form, and R is a cylindrical reverberating-chamber, which is constructed with a concavo-convex crown, and arranged concentrically within the shell B, below the water line, as shown in fig. 2. Between this reverberating-chamber R and the outer shell of the boiler are a number of tubes or flues, T, which pass from the fire-chamber A through the water and steam spaces, and also through the boiler-head into a cone or other suitable escape-chamber or chimney. These vertical flues T are arranged concentrically around the reverberating-chamber R, and their lower ends open directly into the fire-chamber A, at points which are in the same horizontal plane as the lower end or opening of said reverberating-chamber, as shown in fig. 2. The lower end of the shell of the reverberating-chamber, and of the lower ends of the flues T, are united to and sustained by the horizontal diaphragm or crown *g* of the fire-chamber A. Below the diaphragm *g*, and in a plane parallel to it, is the grate G, which is sustained within the chamber A, above the lower end of the boiler, and surrounded by the water in the boiler. This grate G extends out beneath the lower ends of all the ascending-flues T, and supports the coal beneath these flues, as well as beneath the reverberating-chamber R. A door-opening, closed by door D, is made through the boiler-shell B and the shell of chamber R, for the purpose of introducing fuel into the fire-chamber, and admitting small quantities of air, if desired, through a register, *r*. The door-opening *x* is designed for affording access to the fire-chamber A below the door D, for the purpose of affording access to the grate for clearing it. A fire being kindled on the grate-bars G, and the fuel having become well ignited, a fresh supply of coal is introduced through the door D, until the upper surface *a a* of the coal is within the reverberating-chamber R, above the diaphragm *g*, as shown in fig. 2.

The operation is as follows: The ascending direct draught, which is through the grate directly below all the flues T, will quickly render the coal at these points incandescent, and as this coal is burned away the body of coal in the chamber R will descend and spread out laterally, and thus supply its place. The coal which is directly below the chamber R, and that which is in this chamber, will not be supplied with the same quantity of air as the coal below the pipes T; still there will be combustion and generation of gases and smoke, which will rise and fill the chamber R above the level of the coal. The highly-heated gases will be reverberated in cham-

ber R, and caused to pass through or above the incandescent coal, where they will be subjected to such a high degree of heat as will completely destroy them. If it is desired, tubular air-inlets *c* may be arranged in such relation to the points where the most perfect combustion takes place, as will supply air from the exterior of the boiler at such points as shown in fig. 2. In the practical operation of my boilers I have found that the gases communicate considerable heat to the water in the boiler through the shell of the reverberating-chamber R, which is evidenced by the crown-plate of this chamber becoming red hot when the water line is allowed to fall below it.

I do not lay claim to the principle of conducting gases which accumulate in a chamber in a stove through the fire, as this is to some extent accomplished in many of the "base-burning" stoves, in which reservoirs for supplying coal to the fire-chamber are employed. Nor do I claim broadly the "base-burning" principle applied to steam-boilers, as this will be found in the steam-boiler furnace patented July 29, 1856. In this patent a coal-supply cylinder is arranged over a fire-chamber, with provision for the combustion of the fuel within the lower part of the said cylinder.

Having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The reverberating-chamber R and ascending flues T, within the water-space of a steam-boiler, when said chamber and pipes communicate directly with the fire-chamber A, and are so arranged as to cause the gases which accumulate above the coal in said chamber R, to descend and pass through or over the incandescent coal below pipes T, substantially as described.

2. I claim the arrangement of the reverberating-chamber R and ascending flues T, directly over a grate-surface G, which extends beneath the said chamber and flues, and allows of a direct upward draught through it at points below the lower ends of the flues, substantially as described.

3. I claim the gas-reverberating chamber R, arranged within the water-space, in combination with a fire-chamber, A, and the flues T, arranged so as to effect the combustion of the gases, which are caused to escape from chamber R at points below the level of the coal in this latter chamber, substantially as described.

GEO. G. HUNT.

Witnesses:

T. ENSIGN,

C. W. STRONG.