(No Model.)

C. GORTON.

STEAM GENERATOR.

No. 255,107 Patented Mar. 21, 1882.

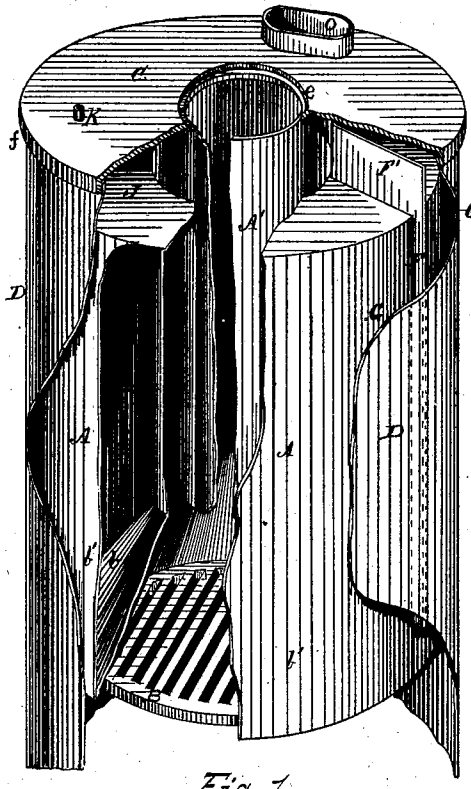


Fig. 1.

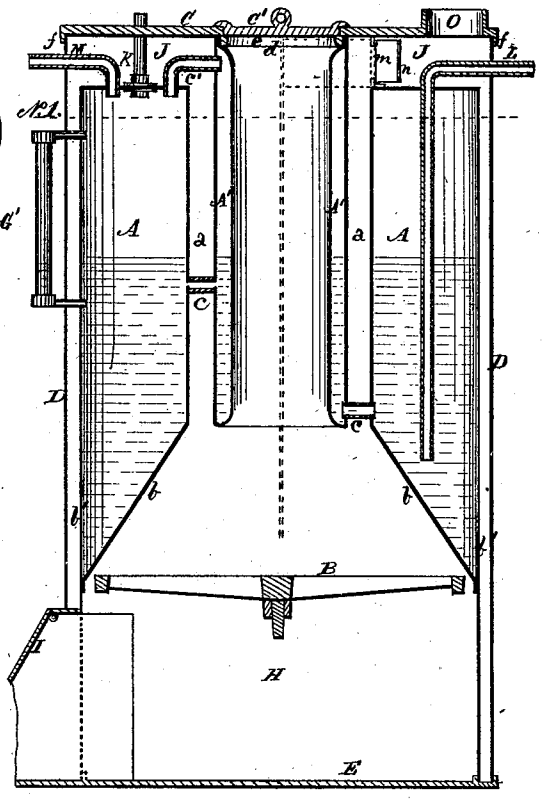


Fig. 2.

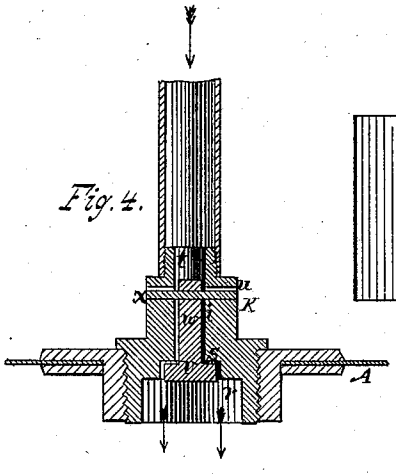
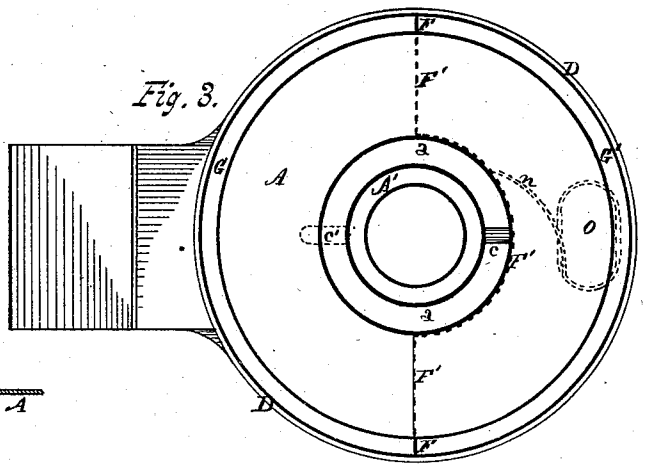


Fig. 4.

Fig. 3.



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UNITED STATES PATENT OFFICE.

CHARLES GORTON, OF ALBANY, NEW YORK.

STEAM-GENERATOR.

SPECIFICATION forming part of Letters Patent No. 255,107, dated March 21, 1882.

Application filed October 13, 1881. (No model.)

To all whom it may concern:

Be it known that I, CHARLES GORTON, of the city and county of Albany, and State of New York, have invented certain new and useful Improvements in Steam-Generators, of which the following is a specification.

This invention relates to that class of boilers known as "magazine base-burning boilers," and has for its object simplicity in construction, cheapness of first cost, and readiness of repair. Its object is also economy of fuel, enlarged heating-surface, thorough circulation of the water, and complete safety.

It consists in constructing the combustion-chamber somewhat in the shape of the frustum of a cone, and in such manner that a cylindrical water-chamber inclosing a feed-magazine forms the apex thereof.

It further consists in forming an outer cylindrical water-space of two parallel walls or shells for a portion of their length, the inner shell flaring from a point near the lower end of the inner chamber outward until it meets the outer shell, to which it is joined, in combination with said inner chamber, and in such manner that an annular flame-space is formed between said inner and outer independent water-chambers, and also the before-described conical combustion-chamber.

It further consists, in combination with the said inner and outer water-chambers and the conical combustion-chamber, of horizontal and vertical deflecting-partitions, whereby the products of combustion are first made to take an upward course through the annular chamber between the concentric independent water-chambers, then horizontally across one-half of the top of the structure, then down a semi-cylindrical flue to a point near the bottom thereof, and then ascending another semi-cylindrical flue to the uptake or chimney, said semi-cylindrical flues forming a jacket for the outer cylindrical portion of the boiler. So it will be seen that the products of combustion pass over the heating-surface of the generator three consecutive times before they escape to the atmosphere.

It finally consists in circulating connecting-pipes and other details of construction, which will hereinafter be more fully described.

Referring more particularly to the accompanying drawings, and to the letters of reference marked thereon, Figure 1 represents a perspective elevation of my improved boiler, a portion of all the shells being broken away for the purpose of showing the internal arrangement of the parts. Fig. 2 illustrates a vertical transverse section of the same, clearly showing the conical combustion-chamber, the peculiar arrangement of the fuel-magazine, the annular flame-flue, and the mode of connecting the inner and outer water chambers. Fig. 3 shows a cross-section on the line 1 1, Fig. 2; and Fig. 4, a vertical longitudinal section of a relief vacuum-valve.

Like letters of reference indicate like parts in all the figures.

A shows the outer cylindrical water-chamber, formed of one long sheet, *b*, on the outside, a shorter shell, *a*, on the inside, and a cone-shaped shell, *b*, forming the bottom thereof. The shell *b* is united or riveted in any well-known manner to the shells *b b'*. This conical shell or bottom forms the sides of the combustion-chamber. One-half of the inner shell, *a*, of the outer water-chamber projects above the steam-space of said chamber, as seen at *m*, Fig. 2, and forms a portion of the horizontal partition F' of the smoke-chamber. A continuation of this partition across the top of the boiler runs from the said projection and joins the flange of the uptake, as seen at *n*, Figs. 2 and 3, in dotted lines, and also in full lines at *n*, Fig. 2. This partition F' extends over the top of the boiler, and extends centrally down the side to near its bottom, as may be seen in dotted lines on Fig. 1, and the same on the opposite side, the purpose of which will be described hereinafter.

Referring to the central or inner water-chamber, which is composed of two annular shells, one fitting within the other, but far enough apart to form a narrow space, A', the inner shell of the inner chamber is flaring at its upper and lower ends, the top for the ready reception of the fuel, and the bottom for the ready delivery of the same.

The two cylindrical water-chambers are connected by means of hollow stay-bolts or thimbles below the water-line, and at the top by means of a bent steam-pipe. These hollow stay-bolts perform a double function—*i. e.*,

that of staying the parts and providing for circulation.

The advantage of circulation in a steam-generator is of the first importance, as by a perfect circulation of the water it is prevented from being in a quiescent state, which is always deleterious, because it does, when at rest, deposit its sediment or foreign substances upon the shell of the boiler, not only subjecting said shell to blister and burn, but preventing the transmission of the heat of the furnace through the plate. When water has a lively circulation it keeps the boiler-plate clean and licks up the heat as it sweeps over the plate, thus causing a rapid generation of steam. The boiler being kept clean lasts much longer, for the reason that the contact of water with the plate is not impeded by any scale or sedimentary deposit. Just above the bottom of the angular water-space I locate my grate-surface, and below this point the outer shell of the outer water-space is continued down to the floor. This shell forms the ash-pit and prevents falling coals from scattering over the floor or outside of the shell of the boiler, thus avoiding all danger from fire. On one side of the lower portion of this shell I arrange my fire-door I. This door is adapted to be regulated for the proper supply of air to the furnace, and upon the top of the shell or jacket is located a cast-iron top, having an annulus which snugly fits the shell. This casting C is provided with a central opening to which is fitted a lid, *c*. Through this opening the reservoir is supplied with coal or other fuel, and near one edge of the casting C is another opening, *o*, which is provided with a flange to which the smoke pipe or chimney is attached. The under side of the top casting forms the upper wall of the return-smoke flue.

It will be observed that the inner water-chamber extends nearly up to the top casting, so that when the reservoir is being filled no coals can fall to either side of it. It will be further observed that reservoir for coal being surrounded with water there is no danger of its burning out, as compared with those made of solid iron, which is a great desideratum.

The pipe L, which enters the side of the outer jacket and into and down inside the boiler to near its bottom, is designed for a feed-pipe. I extend this pipe down inside for the purpose of relieving the feed-water from the chilling effect cold water has when suddenly fed into the boiler. It is evident, however, that the boiler may be fed from other points. Steam may be taken off by means of pipe M.

Safety-valves, water and steam gages, and other appliances used to steam-boilers are not shown. Some changes and modifications may be made in this boiler without departing from the spirit of my invention. I do not therefore desire to be confined to the exact construction shown.

Therefore, having described my invention, its construction, and operation, what I claim as new is—

1. The combination, in a steam-generator, of two independent water-chambers concentrically arranged, the bottom of the outer chamber being angular in cross-section, forming a conical combustion-chamber, and the central water-chamber forming a fuel-magazine and located at or near the apex of said combustion-chamber, in the manner shown and described.

2. The combination, in a steam-generator, consisting of the outer water-chamber, provided with a conical bottom, forming a conical combustion-chamber, of the inner water-chamber located at or near the apex of said combustion-chamber, and which forms a fuel-magazine, and the annular flame-flue formed by and between the inner and outer water-chambers, in the manner set forth.

3. The combination, in a steam-generator, of the two independent water-chambers, as described, the combustion-chamber, the annular flame-flue formed between said chambers and terminating at the lower end of the reservoir, and the upper and lower water-connecting pipes or hollow stay-bolts, constructed and arranged substantially as shown.

4. In a steam-boiler, the combination of the inner and outer water-chambers, connected as described, and forming the annular flame-chamber and the conical fire-box, a segmental portion of the inner wall of the outer chamber projecting above the steam-space, the horizontal and vertical partition, and the casting C, forming the top of the return-smoke flue, all arranged to compel the products of combustion to take an up-and-down and return course, for the purpose described.

CHARLES GORTON.

Witnesses:
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