

E. GODDARD.
Steam-Generators.

No. 144,024.

Patented Oct. 28, 1873.

Fig. 1.

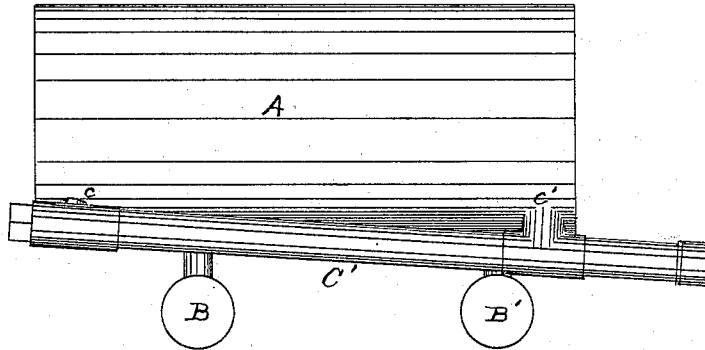


Fig. 2.

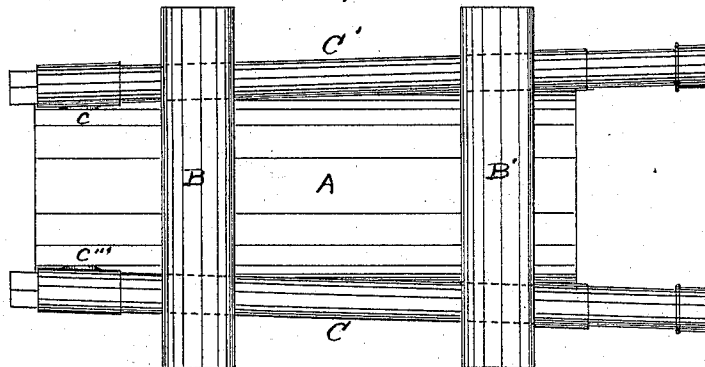


Fig. 3.

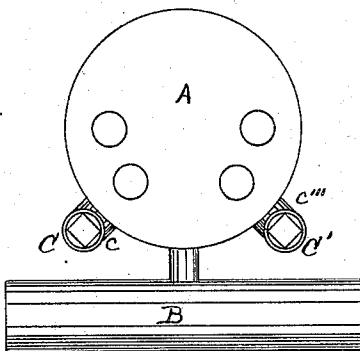
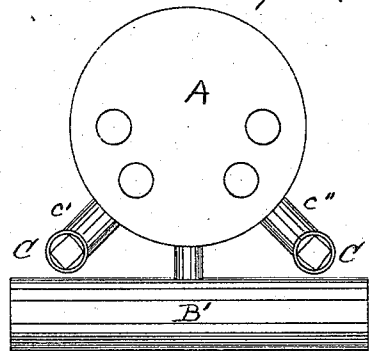


Fig. 4.



WITNESSES

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UNITED STATES PATENT OFFICE.

ELBRIDGE GODDARD, OF ST. LOUIS, MISSOURI.

IMPROVEMENT IN STEAM-GENERATORS.

Specification forming part of Letters Patent No. **144,024**, dated October 28, 1873; application filed May 24, 1873.

To all whom it may concern:

Be it known that I, ELBRIDGE GODDARD, of the city and county of St. Louis, State of Missouri, have invented a new and useful Improvement in Steam-Generators, of which the following is a full, clear, and exact description, reference being had to the annexed drawing making a part of this specification, in which—

Figure 1 represents a side elevation. Fig. 2 represents a bottom plan. Figs. 3 and 4 represent, respectively, front and rear elevations.

Similar letters indicate like parts.

My invention relates to those attachments to steam-generators by which a circulation of the water therein is produced; and consists in a novel mode of constructing and attaching the pipes by which such result is attained. One of the results of my method is a thorough purification of the water in the generator by causing the impurities in the same to be more certainly deposited in the usual mud-drums, and being allowed to remain there undisturbed by the moving water in the generator. Such purification, especially with the waters of the western rivers, is almost impossible to obtain when the circulating-pipes are in any way attached to the mud-drum, since such attachment inevitably causes such an agitation of the water in the drums as to prevent the necessary settling of same, and therefore more or less of the sediment is again carried into the generator. Another object I have is to prevent the burning out of the bottom of the generator, where the most intense flames strike it, by so introducing the water from the circulating-pipes that it shall cause a circulation directly along the bottom of the generator, and by introducing the water at the front of the generator, and as near as possible to the bottom thereof, where the heat is most intense, to obviate the danger of the water lifting at that point by reason of the extreme heat, and leaving the plates bare.

A in the several figures represents a boiler of the ordinary construction, having two of the common mud-drums, B B', Figs. 1, 2; B, Fig. 3; B', Fig. 4; C C', Figs. 2, 3, 4. C', Fig. 1, are two ordinary pipes, such as are commonly used for this purpose, arranged, as seen in Fig. 2, beneath the boiler, and connected with it by

the pipes *c c'*, Fig. 1; *c c'''*, Figs. 2, 3, *c' c''*, Fig. 4, entering the shell of the boiler as near the bottom as possible. The pipes C C' are arranged inclining, as seen in Fig. 1, the lower part being at the rear of the boiler and just escaping the rear mud-drum, as seen, while the forward ends of the pipes are as close to the boiler as possible, so as to be clear of the fire, and thus not interfere with the course of the flame. Of course the boiler is inclosed in the ordinary manner, the rear ends of the pipes C C' extending through the wall, thus enabling the caps at the end of the pipes to be readily removed for the purpose of cleaning the pipes, the other ends of the pipes being within the fire-walls. The water is introduced into the boiler in any manner most convenient. When the boiler is filled, of course the pipes C C' will be full. Now, when the fires are started, of course the water first becomes hot at the front end of the boiler and the pipes C C', causing a movement of the water away from the heat, the consequence of which is that the cooler water in the rear of the pipes naturally seeks the hotter part of the pipes, thereby starting the circulation in the pipes, and continuing the same as long as the fires are kept up and the supply of water furnished. This circulation, it is evident, must be directly along the bottom plates and over the legs of the mud-drums, thus allowing the impurities suspended in the water to fall into the drums, and keeping up a continual scouring of the bottom plates, and not allowing any of the sediment falling on the plates to remain there. The size of the pipes C C' and of their connections with the boilers may be as desired; but the connections must be made as near the bottom of the boiler and as near the ends of same as possible, so as to insure a circulation on the bottom of the boiler, and also have no dead water at the ends of the boiler.

I am well aware that there is no novelty in the use of circulating-pipes to induce a circulation of water in a boiler, such pipes connecting higher and lower portions of the boiler and passing through the fire; and I am also aware that pipes have been used which take the water from and introduce it at the same level and below the water-line; and I am also aware that pipes have been arranged inclin-

ing; and, consequently, I do not claim either of these separately; but

What I claim as my invention, and desire to secure by Letters Patent, is—

The combination, with a steam-generator, of the circulating-pipes C C' and the connecting-pipes *c c' c'' c'''*, the said circulating-pipes being arranged inside the fire-walls, and having their rear ends lower than their forward ends, and

their connection with the generator being such that they take the water from and introduce it into the generator at the ends, and as near the bottom thereof as possible, substantially as shown and specified.

ELBRIDGE GODDARD:

Witnesses:

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