

E. GODDARD.
Steam-Generators.

No. 145,293.

Patented Dec. 9, 1873.

Fig. 1.

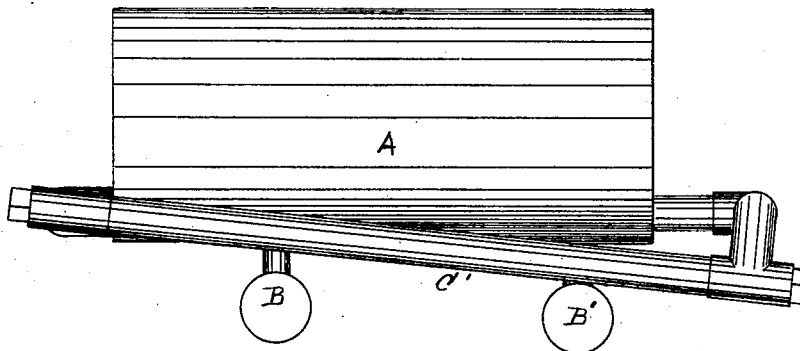


Fig. 2.

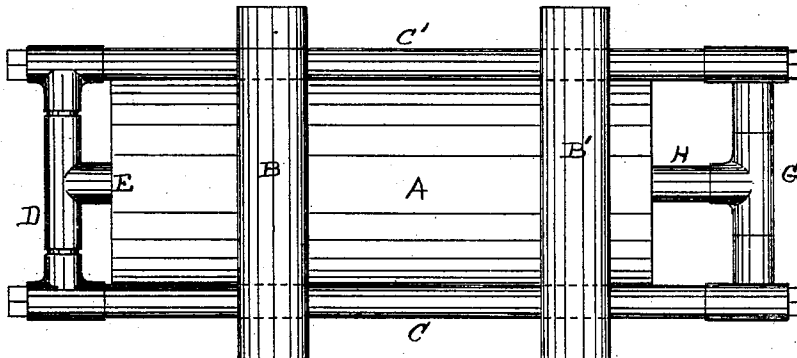


Fig. 3.

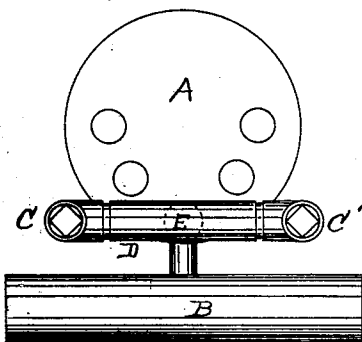
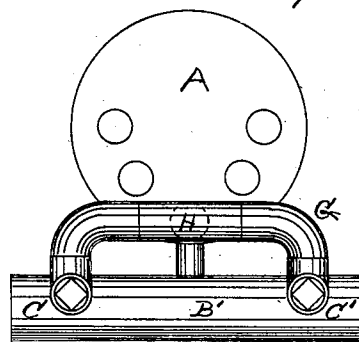


Fig. 4.



WITNESSES

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IMPROVEMENT IN STEAM-GENERATORS.

Specification forming part of Letters Patent No. **145,293**, dated December 9, 1873; application filed June 7, 1873.

To all whom it may concern:

Be it known that I, ELBRIDGE GODDARD, of the city and county of Saint 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 that class of attachments to steam-generators, for causing a circulation of the water therein, shown in my application heretofore filed; and consists in a novel and improved mode of attaching and arranging such pipes. The object of the invention is, mainly, to insure a circulation when, owing to the position of the mud-drum, or other cause, the circulating-pipes have to be arranged in nearly, if not quite, a horizontal position. A further aim is to avoid an interruption of the draft, as much as is possible, in the arrangement of the circulating-pipes. It is also desirable to have the connections of such pipes as accessible and as much out of the direct heat as possible, so that the same may not be injured, and, if needing repairs, be readily reached.

I have provided a construction meeting these demands, which is applicable to all boilers not having too many flues to allow space in the heads for my attachment.

A in the several figures represents a boiler of the ordinary construction, having two 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 usually used for this purpose, arranged, as seen in Fig. 2, beneath the boiler, and extending, at the rear end, through the usual flue-space, and beyond the fire-wall, and, at the forward end, beyond the ordinary fire-front of the boiler. The front ends of these pipes are connected by the pipe D, which, in turn, is connected with the boiler by the pipe E, Figs. 1, 2. The rear ends of the pipes are connected by the curved

pipe G, which latter is connected, by the pipe H, with the rear end of the boiler. Both ends of the pipes C C' are provided with caps or plugs, by removing which the interior of the pipes may be reached; and both ends of these pipes, and also the whole of the pipes D and G and E, and the outer end of the pipe H, being outside of the fire-walls inclosing the boiler, all needed repairs may be readily made, and the connections are not liable, by reason of the direct action of the flame, as in other cases, to become leaky; and when, from the shortness of the leg of the mud-drum or other cause, it is impossible to have the attachment at the lowest points of the boiler, (which last-mentioned feature is absolutely essential,) and yet attain the inclination shown, or, indeed, any perceptible inclination, this connection outside the rear wall compensates for the want of such inclination by providing a more circuitous route for the water at the cooler end of the boiler, and an excess of pipe at the same end beyond the flue-space; for both of said last-mentioned conditions promote a circulation in the pipes that is in harmony with that in the boiler.

The several pipes may be made of any desired size, care, however, being taken to make the capacity of the pipe E entering the boiler as large, or larger, than the united capacities of the two branches of the pipe D, in order that the water passing through the pipes C C' may receive no check as it passes into the boiler, but may have a free and continuous flow.

The pipes E and H enter the ends of the boiler as near the bottom as possible.

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

The combination of the boiler A, pipes C, C', D, E, G, and H, both ends of the pipes C C', the whole of the pipes D and G and E, and the outer end of the pipe H, outside of the fire-walls, inclosing the boiler, and all constructed, arranged, and operating, substantially as and for the purpose shown and specified.

ELBRIDGE GODDARD.

Witnesses:

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