R. GERNER.

Steam-Generators.

No. 143,007. Patented September 23, 1873.

Fig. 1.

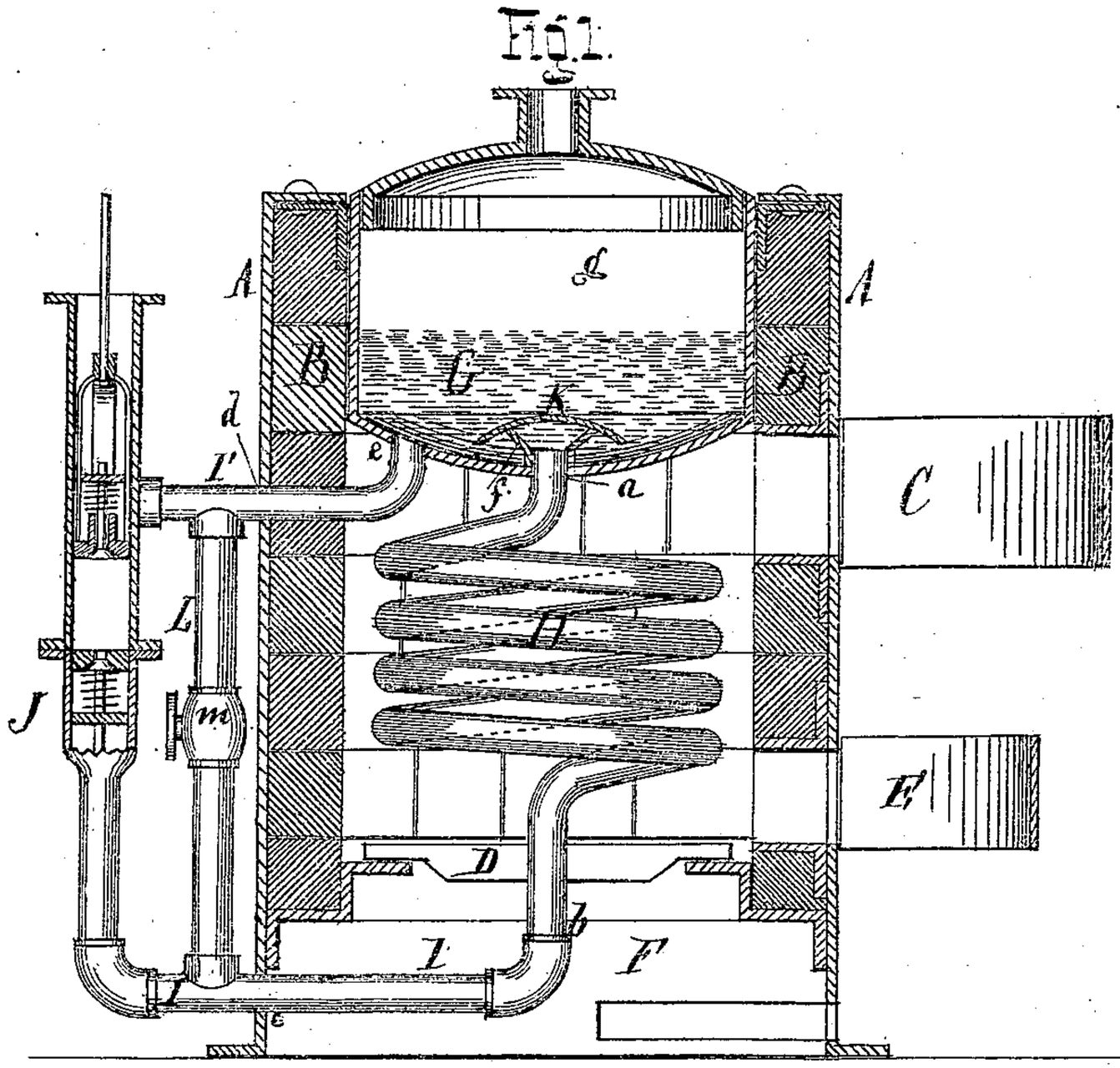
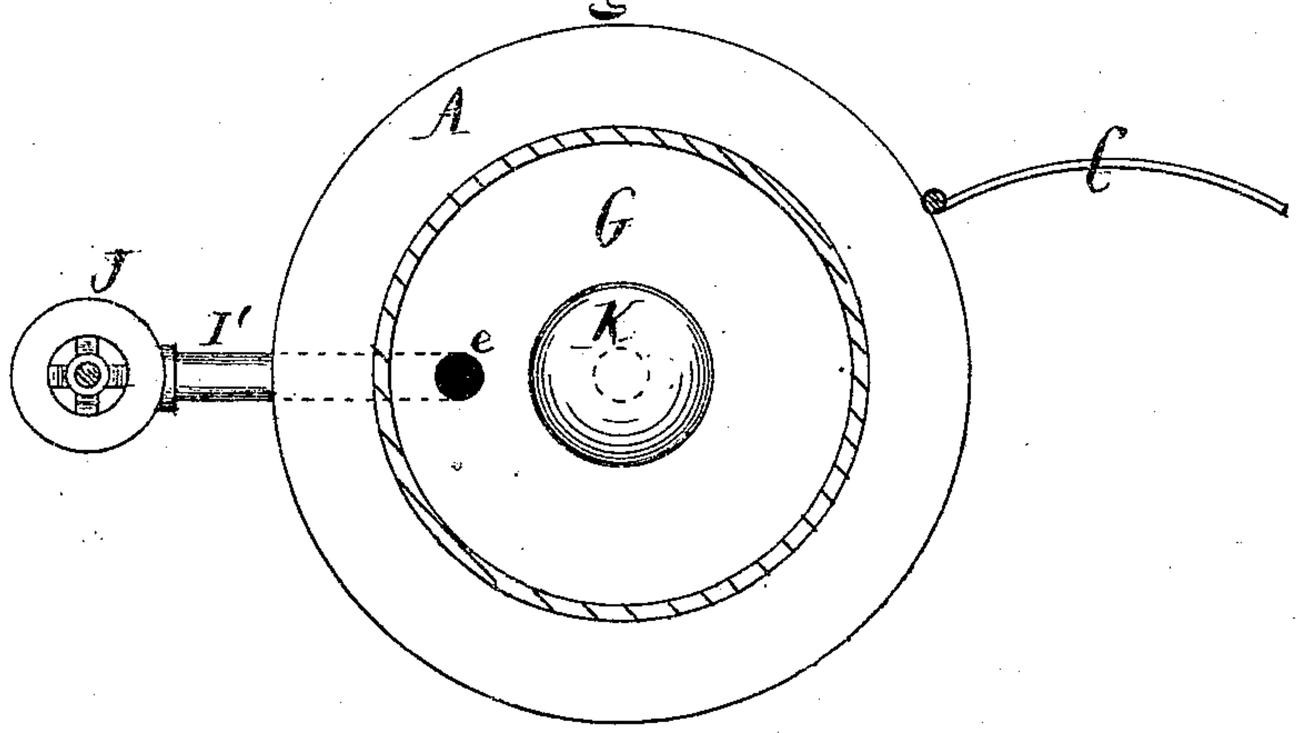


Fig. 2.



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UNITED STATES PATENT OFFICE.

RICHARD GERNER, OF NEW YORK, N. Y.

IMPROVEMENT IN STEAM-GENERATORS.

Specification forming part of Letters Patent No. **143,007**, dated September 23, 1873; application filed July 14, 1873.

To all whom it may concern:

Be it known that I, RICHARD GERNER, of the city, county, and State of New York, have invented certain Improvements in Steam-Generators, of which the following is a specification:

The object of my invention is to provide an apparatus which will generate steam quicker, cheaper, and safer than has been done by the steam-boilers heretofore in use. My invention consists in connecting a tube to a steam-boiler in such a manner that a part of said tube is coiled up in the furnace under the boiler, and a part of said tube which is not coiled forms the connection between the part coiled and another part of said boiler. This part of the tube is placed outside of the furnace, and in it is inserted a suitable pump, which forces the water from the upper part of said tube, which communicates with the water in the boiler, into the lower part of said tube, and from this through the heated coil, by which the steam generated in the coiled tube is forced away, and water is again presented to this surface to generate more steam. By this arrangement a more effective surface is secured in less space to generate a given quantity of steam than in the heretofore-known steam-boilers, securing immunity from explosion, owing to the strong form and small diameter of the boiler, as well as the tube.

As so much less material is required, cheapness of first cost is obtained, and as the heat is utilized by a quick transmission through the coiled tube, economy in fuel is obtained.

By the constant forcing of the water through the coiled tube, no sediment will adhere to the surface.

Where a large quantity of steam is required to be generated, and where space is an object, a number of coiled tubes may be used, all connected with the other parts, as in the case of the single coiled tube.

In order to describe my invention more fully, I refer to the accompanying drawing forming a part of this specification.

Figure I represents a vertical sectional view of a steam-generator embodying my invention. Fig. II is a plan view with the top of the boiler removed.

A is the casing; B, fire-brick; C, the fire-door for feeding the grate D; E, the door for cleaning the grate; F, the ash-pit; G, the steam-boiler; H, a coiled tube, connecting at *a* with the boiler G, and at *b* with the tube I, which is carried through and under the grate, and through the side of the casing A at *c*, and extends upward by the side of the casing, and connects with the pump J. The upper part of this pump is connected with the tube I′, which is carried through the casing A at *d*, and connects with the boiler G at *e*. K is a circular concave disk or diaphragm, with legs *f f* placed near to and over the upper end of the coiled tube H, in order to prevent the water, when injected with great force through the heated coil into the boiler, from being thrown up into the steam-space. The tube L, having the cock *m*, also connects the tubes I and I′, so as to allow the circulation of the water while heating and getting up steam and the pump not working. The cock *m* is left open until sufficient steam is generated to run the engine, to allow the free circulation of the water. When the pump J is working the cock *m* is closed.

Having thus described my invention, I claim as follows:

The combination of steam-boiler G, having two water-inlets and one outlet, coiled tube H, having diaphragm or disk K, tube I, connected with tube L and pump J, and tube I′, also connected to tube L and pump J, and to boiler G, all arranged substantially as described.

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