

R.W. Dugan & B.F. Clark. Steam Generator.

No. 118,702.

Fig. 1.

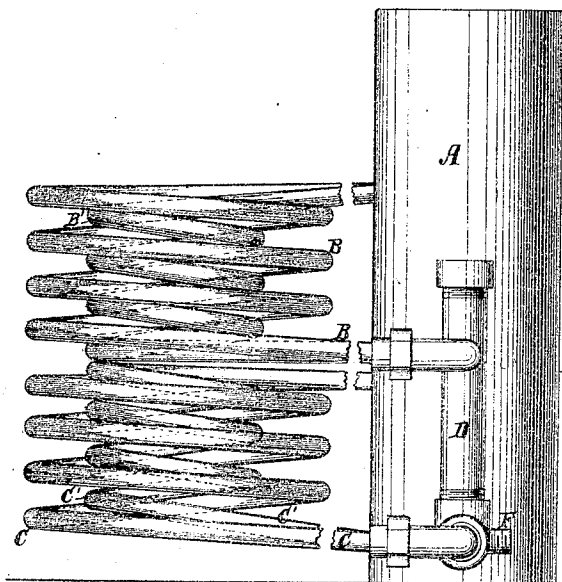


Fig. 2.
Patented Sep. 5, 1871.

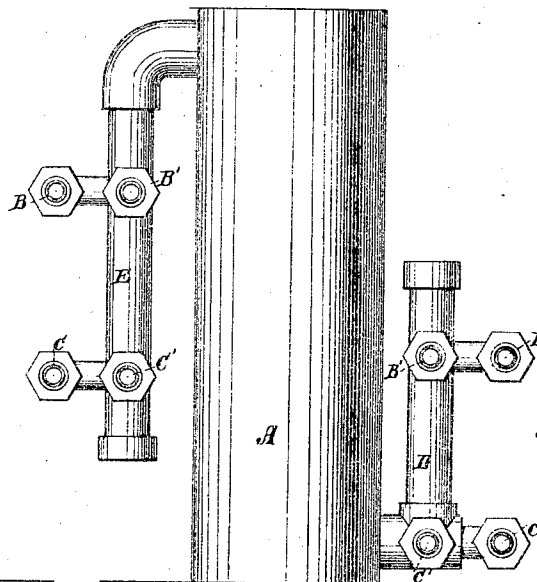


Fig. 3.

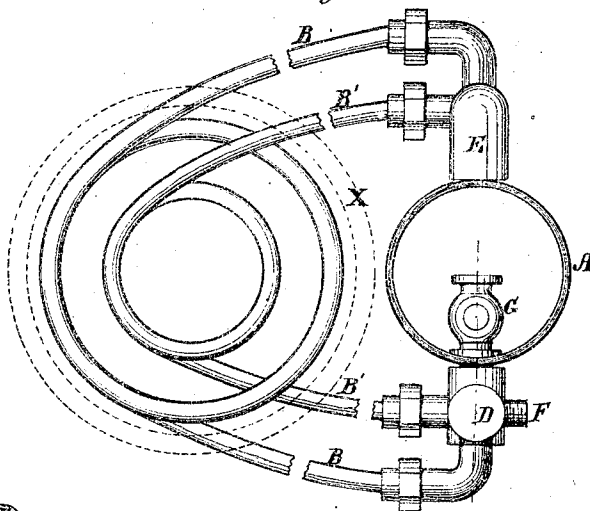
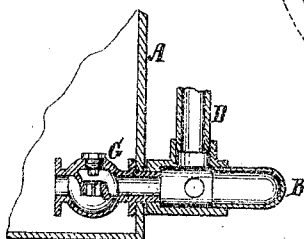


Fig. 4.



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UNITED STATES PATENT OFFICE.

RUS W. DUGAN, OF COVINGTON, KENTUCKY, AND BENJAMIN F. CLARK, OF
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IMPROVEMENT IN STEAM-GENERATORS.

Specification forming part of Letters Patent No. 118,702, dated September 5, 1871.

To all whom it may concern:

Be it known that we, **RUS W. DUGAN**, of Covington, in the county of Kenton and State of Kentucky, and **BENJAMIN F. CLARK**, of Cairo, in the county of Alexander and State of Illinois, have invented a new and useful Improvement in Steam-Generators; and we do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawing forming part of this specification.

This invention relates to improvements in the construction of steam-generators; and it consists in a combination of heating-coils and a cylinder, calculated to provide a simple and efficient generator, by which steam can be rapidly and economically made, with no danger of explosion, and with but little wear or injury to the parts, the cylinder being placed outside of the furnace, inclosing the coils in which the steam is generated, all as hereinafter described.

Figure 1 is a side elevation of the improved generator. Fig. 2 is also a side elevation, but in a plane perpendicular to the plane of Fig. 1. Fig. 3 is a top view with the head of the cylinder removed, and Fig. 4 is a section of Fig. 3 on line *x x*.

Similar letters of reference indicate corresponding parts.

A is a hollow vertical cylinder, of boiler-iron heavier than commonly used for boilers, which we propose to use as a reservoir for water and steam, with coils B B' and C C' of pipe, to be used mainly for generating the steam, being placed in the most direct contact with the fire, while the cylinder will stand at one side or at the rear of the furnace. We connect the coils at one end to the large pipe D, having one connection to the cylinder near the bottom, and at the other end to the large pipe E, connected to the cylinder near the top to save cutting and weakening the said cylinder as much as would be necessary if directly connected. The lower ends of the coils are connected to the pipe D, and the upper ends to pipe E, to facilitate the

circulation of the water and steam, the water running in the coils at the lowest connections and the steam at the highest. The supply-pipe will be attached to the bottom of pipe D at F, and a check-valve will be placed in said pipe D between said connection and the cylinder, say at G, to prevent the feed-water from flowing directly in and cause it to flow through the lower coil. This check-valve will rise in case the feed-water stops for any cause, and allow the water to flow into the coils from the cylinder. The mud will deposit on the bottom of the cylinder, when there will be no danger of burning, and it may be readily blown off from time to time, as may be required.

This improved steam-generator is simple and cheap to make, can be worked by any one without danger, and scale and sediment will not materially affect it, as none will be deposited in the coils of pipe. The parts generating the steam can be readily removed and replaced, as the sections of pipe will be put together with union joints. No part of the cylinder comes in contact with the fire, being placed outside of the furnace, so as not to be injured by it; consequently it may be made of thick and strong iron without danger of burning. The cylinder may be of small diameter and of such thick iron as to preclude the possibility of bursting. Expansion and contraction will not materially affect any of the parts, as the coils which are subject to the greatest heat can sustain any amount they may be subject to without injury.

Should water at any time get low the only serious damage that could occur would be the burning off of some of the coils of pipe, which would let the water upon the fire and put it out, and they could be quickly removed and others applied; and this may even be done without cooling off or letting down the steam, as each connection with the pipes D and E will be provided with a throttle-valve, by which the escape of steam can be instantly stopped.

The cylinder should be placed so far away from the furnace-wall (indicated in dotted lines) that the engineer can pass between them freely

for inspection, &c., the connection being formed by the extension of the pipes at the ends of the coils through the furnace-walls, as indicated in Fig. 2.

The effect of our new mode of constructing and combining the parts of a steam-generator is to lessen the wear and liability to explosion.

Having thus described our invention, we claim as new and desire to secure by Letters Patent—

The combination of the cylinder A, pipes D

E, coils B B' C C', supply-pipe F, and check-valve G, all substantially as specified.

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