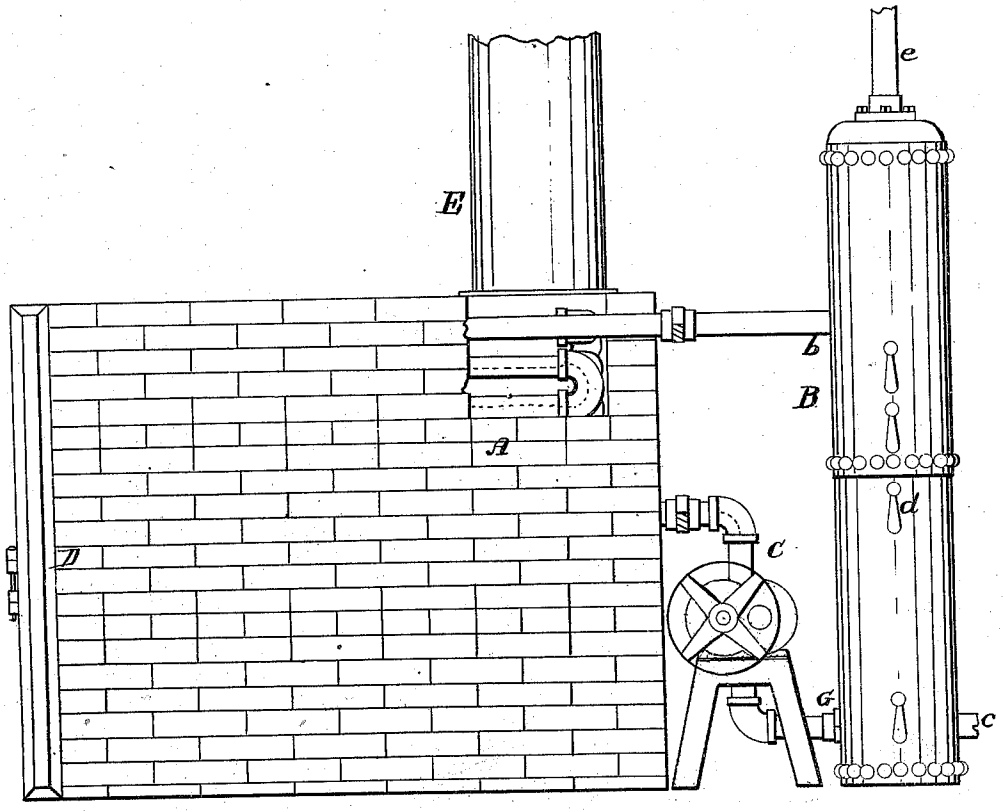
S. T. Russel.

Steam Generator

No. 94,978. Patented, Sept. 21, 1869.



Witnesses;
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S. T. RUSSELL, OF SPRINGFIELD, OHIO.

Letters Patent No. 94,978, *dated September* 21, 1869.

IMPROVEMENT IN STEAM-GENERATORS.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, S. T. RUSSELL, of Springfield, in the county of Clark, in the State of Ohio, have invented a new and useful Improvement in Steam-Generators; and do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawing, making a part of this specification.

My improvement is on the continuous tube, or coiled-pipe steam-generator. The complete generator consists of a single continuous tube or pipe, coiled in layers, in which the steam is generated. This coiled pipe has both its ends connected to a receiver, which may or may not be in contact with the fire, and a pump for circulating water through the coiled pipe from the receiver and back to the receiver.

In the drawing—

The coiled pipe is seen at A;

The receiver at B; and

The pump at C.

The pipe is connected to the receiver B at *a* and *b*. It is coiled in layers, as shown at A, and enclosed in a jacket of iron plates, or in brick-work. The pipe may be of iron, copper, or other material.

The fire-box is at D.

The smoke-flue is at E.

The receiver B may be constructed of boiler-plate, or other suitable material, of any size, and located anywhere, relative to the coiled pipe, convenient.

The pump C may be of any suitable construction that will work hot water. The one here represented is composed of two cogged wheels, enclosed in an iron case. It is connected with the pipe leading from the lower part of the receiver B at *a*, to the coil A, as shown.

The object in connecting each end of the coiled pipe A to the receiver B is to obtain an abundant circulation of water through the pipe, without having any carried over with the steam to the engine.

The object of the pump C is to keep a constant and abundant supply of water in the coiled pipe.

This generator is operated substantially as follows:

The supply of water is delivered to the receiver B, through the pipe *c*.

The quantity of water in the receiver is determined by the try-cocks *d*. Water is taken from the receiver B at *a*, by the pump C, and forced into the coiled pipe A. The pump C is operated by hand when the generator is cold; also, in getting up steam, if necessary.

Having as much water in the receiver and coiled pipe as desired, say each half full, a fire is built in the fire-box at D.

The products of combustion pass among the coils of pipe A, generating steam in them, and pass out through the smoke-flue E.

The steam generated in the pipe passes into the receiver B at *b*, and all water carried over with it separates from it as soon as it enters the receiver, the water in the receiver always being carried far enough below the mouth of the pipe at *b* to admit of a free separation of the steam and water as they enter.

The steam is taken from the receiver B, for use, through the pipe *e*.

When steam has been raised, and the engine put in motion, the pump C is driven by a belt from a line or countershaft, and is run at such a speed as will force more water into the coiled pipe than can be generated into steam while passing through it. The object of this is to insure a constant and abundant supply in the pipes, for it frequently happens that steam is generated in the lower part of the pipe and forces much of the water above it over into the receiver. The pump is kept in motion all the time it is desired to generate steam. The pump C may be run by an engine solely for that purpose.

The advantages of my improvements, which consist in connecting each end of the coiled pipe A with the receiver B, for the purpose of obtaining an abundant and positive circulation through the coiled pipe, without having any water carried over with the steam to the engine, or blown off and wasted, to prevent its going into the engine, by giving the water and steam a chance to separate as it enters the receiver at *b*; also, connecting the pump C with the pipe, between the coil and the receiver, for the purpose of forcing the water from the receiver through the pipe, and maintaining an abundant and positive circulation.

What I claim as my invention, and desire Letters Patent on, is—

The pump C, in combination with a single continuous coiled tube or pipe, steam-generator A, and the receiver B, constructed substantially as described and set forth.

S. T. RUSSELL.

Witnesses:

JAS. A. CASHMAN,

MAURICE I. RILEY.