No. 678,911. Patented July 23, 1901.

F. E. & F. O. STANLEY.

STEAM GENERATING APPARATUS.

(Application filed Jan. 30, 1900.)

(No Model.)

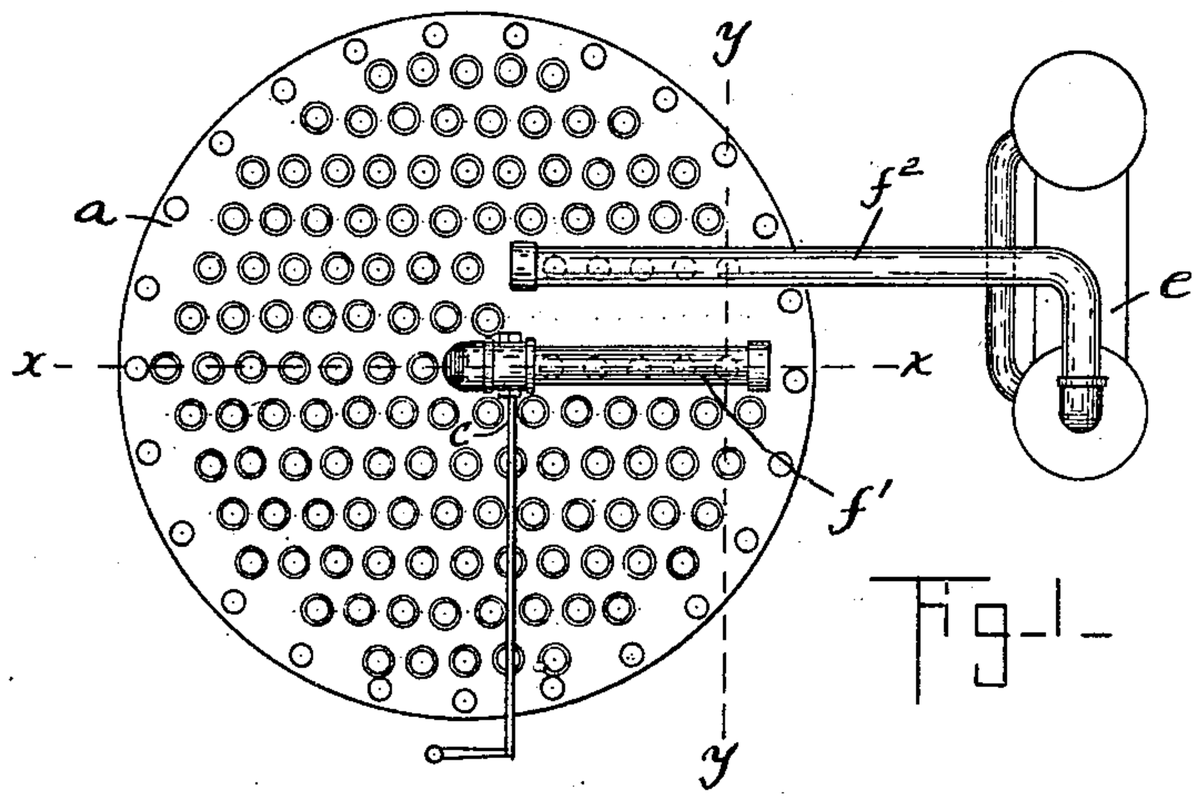

Fig. 1.

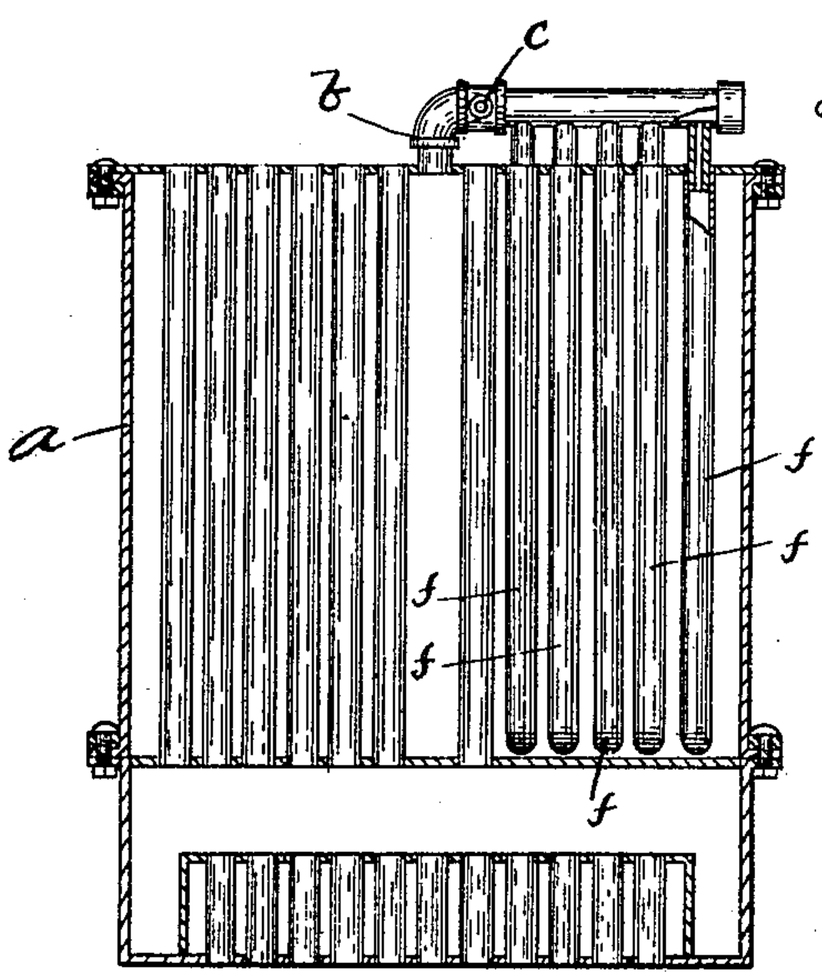

Fig. 2.

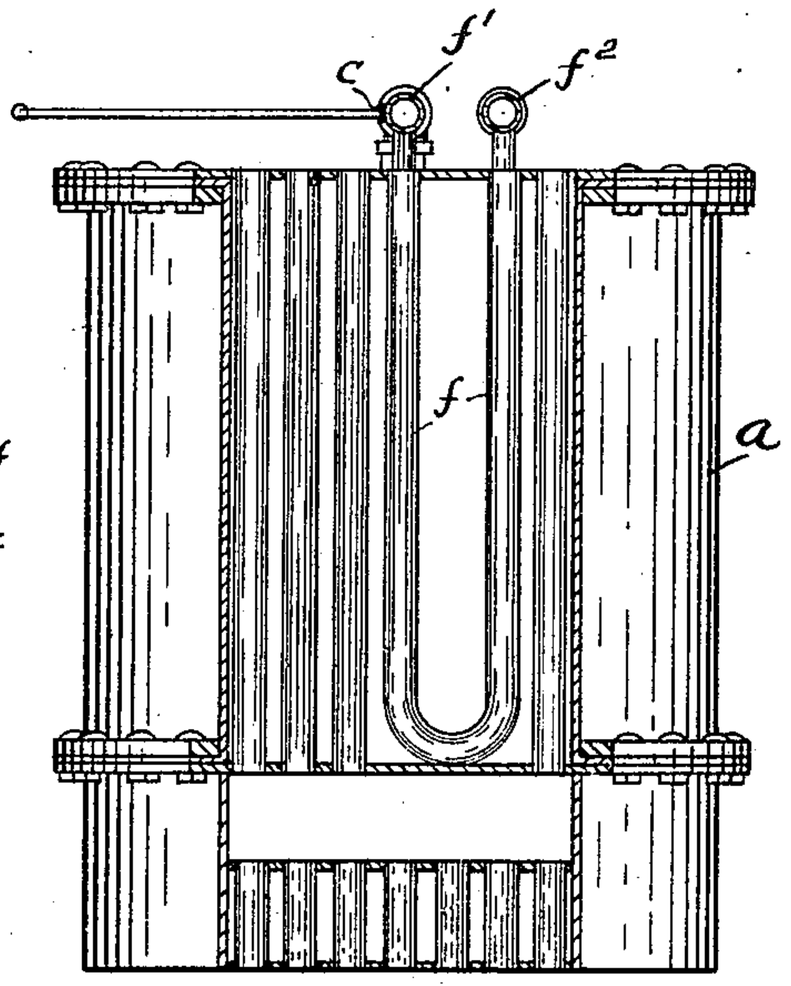

Fig. 3.

Witnesses:
H. B. Davis.
J. L. Hutchinson.

Inventors
Francis E. Stanley
Freelan O. Stanley
by B. J. Hayes, Atty

UNITED STATES PATENT OFFICE.

FRANCIS E. STANLEY AND FREELAN O. STANLEY, OF NEWTON, MASSACHUSETTS.

STEAM-GENERATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 678,911, dated July 23, 1901.

Application filed January 30, 1900. Serial No. 3,324. (No model.)

To all whom it may concern:

Be it known that we, FRANCIS E. STANLEY and FREELAN O. STANLEY, of Newton, county of Middlesex, and State of Massachusetts, have invented an Improvement in Steam-Generating Apparatus, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

In motor-carriages operated by steam it is now customary to conduct the steam from the steam-generator to the steam-chest of the engine by a pipe which is controlled by the throttle-valve, as is usual in steam-generators and engines employed for other purposes; but for this particular work it is necessary, on starting the carriage, to open the throttle-valve but a little way in order to start slowly, and in practice we find that when the throttle-valve is opened but a little way the pressure of steam delivered to the engine is very materially reduced, and also its temperature is correspondingly reduced, and consequently its capability of performing the work required of it is impaired to a considerable extent, and when used in proper quantities to perform the work required of it the consumption of water is large.

This invention has for its object to improve the construction of steam-generating apparatuses, whereby the steam after passing the throttle-valve will be additionally heated or superheated before it reaches the steam-chest of the engine, so that even though the throttle-valve is opened but a little way and but a small quantity of steam delivered at a reduced pressure yet the steam will be increased in temperature to such an extent that it will possess the requisite energy.

In carrying out this invention we provide a device which we call a "superheating device," by which the temperature of the steam is increased, and this superheating device is located between the throttle-valve and the steam-chest of the engine. The superheating device consists of one or a number of tubes projecting into or passing through the boiler, which will be at all times in open communication with the pipe which conducts the steam to the steam-chest of the engine after passing the throttle-valve.

Figure 1 shows in plan view a steam-generating apparatus embodying this invention. Fig. 2 is a vertical section of a steam-generating apparatus shown in Fig. 1, taken on the dotted line $x\ x$; and Fig. 3 is a vertical section of the steam-generating apparatus shown in Fig. 1, taken on the dotted line $y\ y$.

a represents a boiler, which so far as this invention is concerned may be of any usual or suitable construction, although an upright tubular boiler is herein shown, and *b* is a steam-pipe leading from the boiler, and *c* the throttle-valve, which is adapted to be operated by any suitable means.

e represents an engine, to the steam-chest of which the steam is conducted.

The superheating device, as herein shown, consists of a number of U-shaped tubes or pipes *f*, four being herein shown, which are contained within or project down into the boiler *a*. The upper ends of said U-shaped pipes *f* are connected, respectively, to the pipes f' f^2, which are herein shown as disposed above the boiler and located in parallelism in horizontal plane. The pipe f' is connected with the pipe *b*, and the pipe f^2 is connected with the steam-chest of the engine *e*. The steam which passes through the pipe *b* and throttle-valve *c* enters the pipe f' and then passes through the U-shaped pipes *f* into the pipe f^2 and thence to the steam-chest of the engine. This form or construction of superheating device possesses many advantages by reason of its simple construction.

By raising the temperature of the steam after it passes the throttle-valve and before it reaches the engine we find that the consumption of water is very materially reduced.

We claim—

1. The combination of a boiler, an engine, and means for conducting steam from the boiler to the engine having as a coöperative part of it a superheating device contained in the boiler, and consisting of one or more tubes projecting into the boiler, and a throttle-valve located between said boiler and superheating device, substantially as described.

2. The combination of a boiler, pipe *b* leading therefrom, throttle-valve, a superheating device comprising one or more U-shaped tubes projecting into the boiler and connected at their ends with pipes f', f^2, said pipe f' being connected with the pipe *b* and said pipe f^2 leading to the engine, substantially as described.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

FRANCIS E. STANLEY.
FREELAN O. STANLEY.

Witnesses:
B. J. NOYES,
J. L. HUTCHINSON.