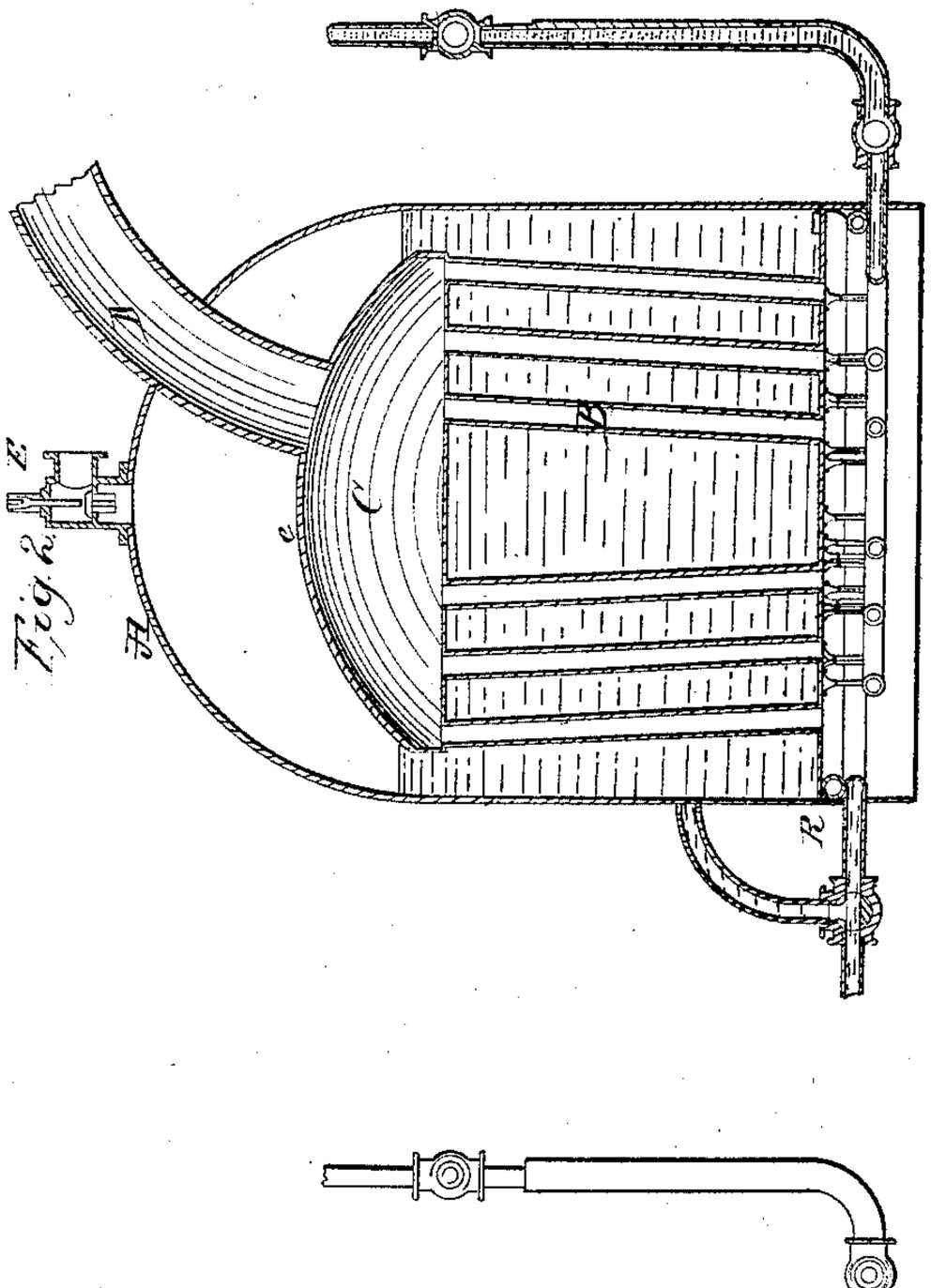
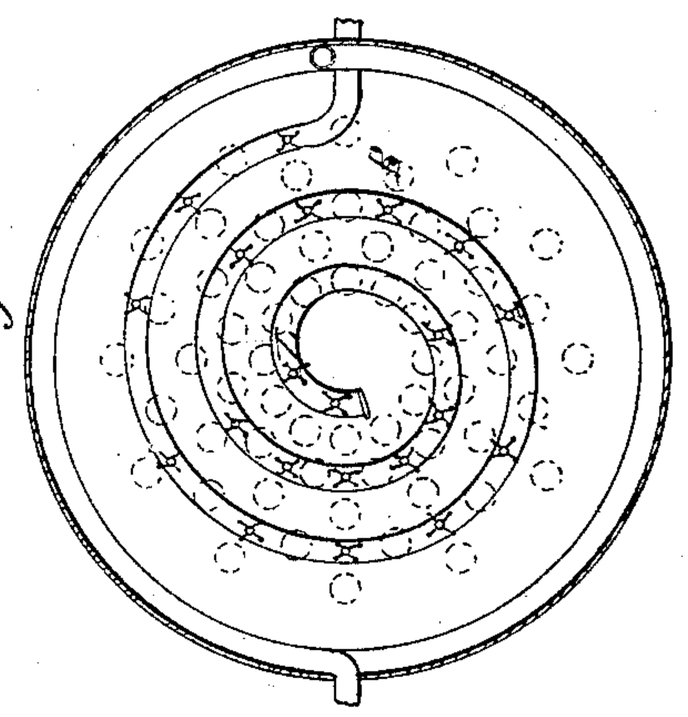
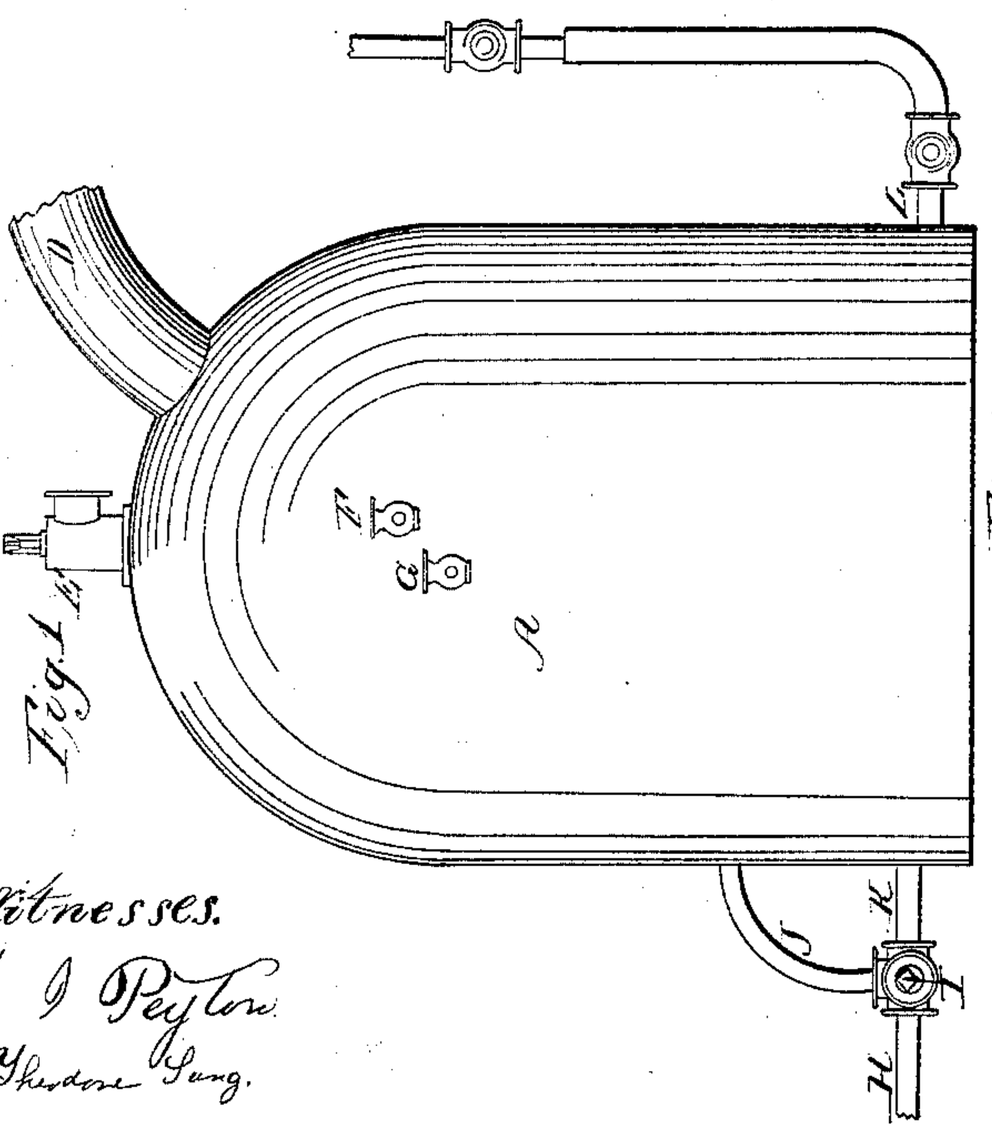
H. S. Saroni,

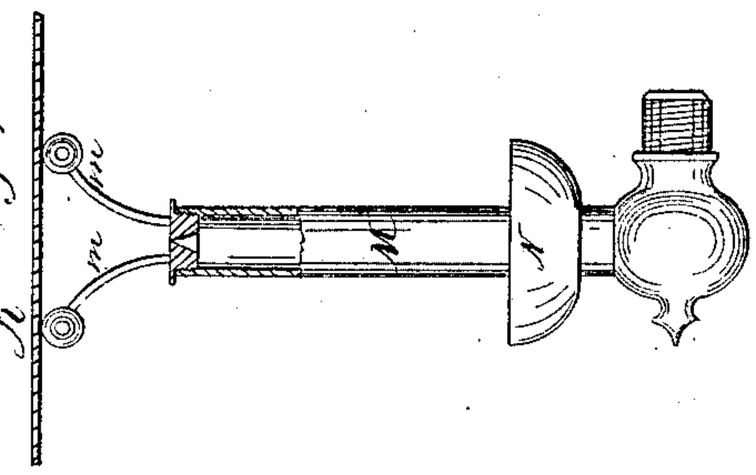
Steam-Boiler Fire-Tube.

No. 57,575. Patented Aug 28, 1866.









Witnesses.
J. J. Peyton
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Inventor.
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by his Attys
Baldwin & Son

UNITED STATES PATENT OFFICE.

HERRMAN S. SARONI, OF MARIETTA, OHIO.

IMPROVEMENT IN STEAM-GENERATORS.

Specification forming part of Letters Patent No. **57,575**, dated August 28, 1866.

To all whom it may concern:

Be it known that I, HERRMAN S. SARONI, of Marietta, in the county of Washington and State of Ohio, have invented a certain new and useful Improvement in Apparatus for Generating Steam, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which make part of this specification, and in which—

Figure 1 represents a view, in elevation, of a steam-boiler to which my improvement is applied. Fig. 2 represents a vertical central section through the same; Fig. 3, a bottom view of the same inverted, and Fig. 4, a view, partly in section, of one of the burners detached.

It is the object of my invention to adapt the hydrocarbons to the generation of steam; to which end the improvement herein claimed consists, first, in coiling the feed-pipe around the burners to heat the feed-water before entering the boiler; second, in a device for establishing a circulation between the boiler and feed-pipe; third, in so combining the burners with the boiler that the bottom of the boiler shall form the heater-cap for the burner.

In the accompanying drawings, which exemplify one convenient mode of carrying out the objects of my invention, my improvement is shown as applied to a dome-shaped boiler consisting of a shell, A, containing a series of tubes, B, arranged vertically or at a slight inclination, through which the products of combustion pass to a smoke-box, C, and thence escape through a suitable chimney, D.

The boiler is to be provided with a suitable safety-valve, E, steam-gage F, and water-gage G. By reference to Fig. 2 it will be seen that the crown-sheet *c* of the smoke-box projects above the water-line (shown in blue) into the steam-dome, and thus serves to superheat the steam.

The boiler is supplied with water through a feed-pipe, H, provided with a three way cock, I, at a point where the pipe branches, the upper branch, J, going direct to the boiler some distance above its bottom, while the other branch, K, is coiled around the burners beneath the boiler, and finally enters the boiler through the bottom. By this means I can both heat the feed-water and maintain the circulation of the water through the boiler and pipes, as hereinafter explained. In this instance the burners are shown as arranged on a spiral pipe, L, into which the petroleum or other fluid is fed from a reservoir in the usual way.

By reference to Fig. 4 it will be seen that the burners M are of the ordinary construction, except the conductor or heater-cap portion, which I make of two or more prongs, *m*, which touch the bottom of the boiler, which thus forms the heater-cap.

By reference to Fig. 4 it will be also seen that the burners are arranged between the tubes, so as to cause the flame to impinge against the bottom of the boiler before escaping through the tubes.

The operation is as follows: The boiler being supplied with water, the cups N of the burners are filled with alcohol or other inflammable fluid and ignited. The heat thus generated vaporizes the fluid in the pipe M. This vapor escapes through the jets of the burner, and impinges against the bottom of the boiler, where it is ignited and burns. After burning a few moments, the heat thus generated is conveyed through the prongs or conductors to the burners, and is sufficient to generate the vapor as rapidly as required. The products of combustion pass up through the flues to the smoke-box, and thence escape through the chimney.

While the feed-pump is going the three-way cock is turned so as to force the feed-water through the spiral pipe and heat it before entering the boiler. When the pump is stopped the cock is placed so as to shut off the communication with the pump and open a passage between the upper branch pipe, J, and the spiral pipe K. As this pipe enters at the bottom of the boiler, which is its hottest part, it is obvious that an upward current will be created. The water will thus flow down through the branch pipe and the spiral pipe, and re-enter the boiler, thus maintaining an active circulation, economizing heat and fuel, and preventing the burning of the feed-pipes.

It is obvious that the details of my boiler may be varied in many ways without departing from the spirit of my invention; but such

modifications would readily suggest themselves to any skillful mechanic on reading my specification.

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

1. The arrangement of the feed-water pipe in a coil beneath the boiler and around the burners, as and for the purpose described.

2. The combination, substantially as described, of the boiler, the branch pipe, the feed-water pipe, and the burners, for the purpose of securing a circulation in the boiler, as set forth.

3. The arrangement of the burner with its conductors in contact with the boiler, so that the boiler forms the heater-cap for the burner.

In testimony whereof I have hereunto subscribed my name.

HERRMAN S. SARONI.

Witnesses:

J. I. PEYTON,

EDM. F. BROWN.