O. CLARKE.

Steam Generator.

No. 100,983. Patented March 22. 1870.

Fig. 1.

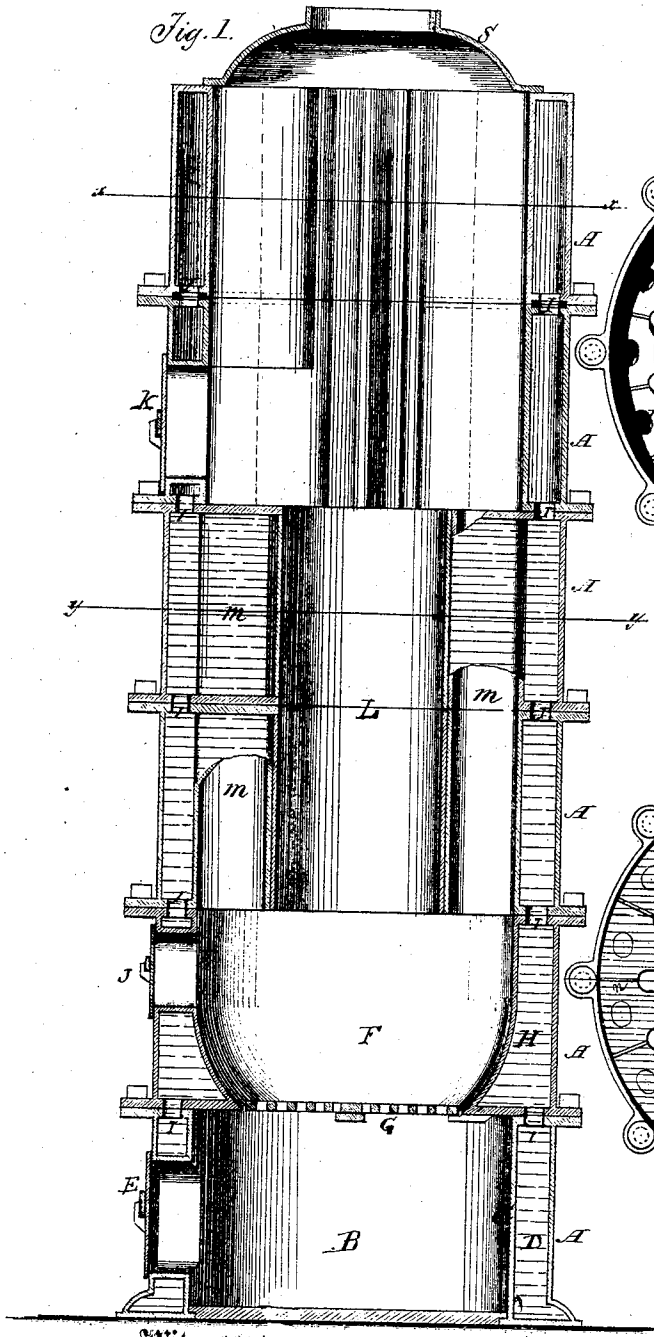


Fig. 2

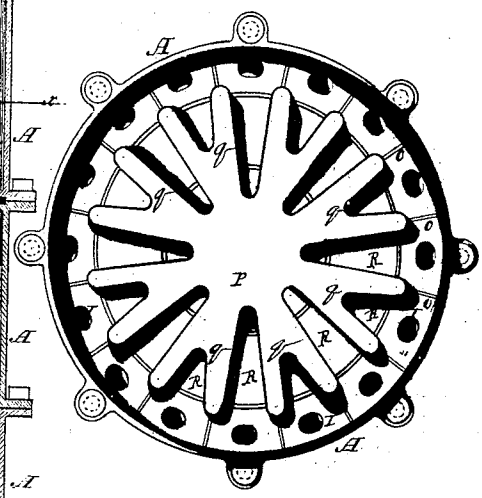
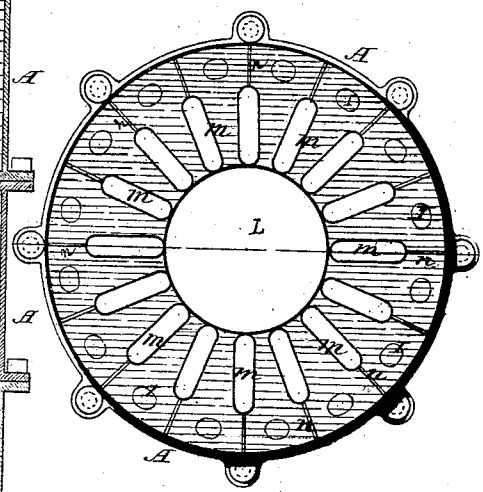


Fig. 3.



Witnesses:

Gustave Dietrich

Alex F. Roberts

Inventor:

O. Clarke

PER Munn & Co.

Attorneys.

United States Patent Office.

ORLANDO CLARKE, OF ROCKFORD, ILLINOIS.

Letters Patent No. 100,983, *dated March* 22, 1870.

SECTIONAL STEAM-GENERATOR.

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, ORLANDO CLARKE, of Rockford, in the county of Winnebago, and State of Illinois, have invented a new and useful Improvement in Steam-Generator and Water-Heater; and I 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 drawings forming part of this specification.

This invention consists in forming the boiler in sections, secured together by means of flanges or ears and bolts, with the joints packed, and the sections provided with fire-flues and water and steam-passages, furnace, and fuel-magazines, constructed and arranged as hereinafter more fully described.

In the accompanying plate of drawings—

Figure 1 represents a vertical central section of the boiler, showing its general construction and arrangement of parts.

Figure 2 is a horizontal section through the line *x x* of fig. 1.

Figure 3 is a horizontal section through the line *y y* of fig. 1.

Similar letters of reference indicate corresponding parts.

In this example of my invention I show a generator composed of six sections, with joints made steam-tight between them, and secured together by bolts or screws in any substantial manner; but I do not confine myself to any particular number of sections, as it will be apparent that by adding to or diminishing the number of the sections, the size or capacity of the boiler may be varied, as may be desired.

The sections are cylindrical in form, with an outer shell, marked A, which is provided with ears or flanges, for bolting or securing them together.

B is the lower section or ash-pit, composed of an outer shell, A, and an inner casing, C, having an annular water-space, D, around it, which serves as a receptacle for sediment.

E is an aperture, closed by a suitable door, for cleaning the pit B of ashes, admitting air for the support of combustion, and working the fire-grate, which is made to vibrate on a center, and also to revolve or dump on pivots.

The fire-box or furnace is approximately in form of a frustum of a cone inverted, and is surrounded by the water-space H.

The water-spaces of these two lower sections are connected by apertures, I, through the top and bottom plates of the sections, as seen in the drawings.

These oval-shaped (or other shaped) apertures I are seen connecting the water and steam-spaces of all the sections; the two upper sections (or the most of them) being designed as a reservoir for steam.

J represents a door, which gives access to the fire-box, to be used in starting and regulating the fire.

The fuel is introduced through the door-way K, above the fuel-magazine L, which is formed by the two middle sections.

m represents fire-flues through these two sections, through which the products of combustion pass.

n represents stays, by which the outer shells are secured to these flues *m*.

The same system of staying the shells of the other sections is pursued.

O represents the stays in the upper sections.

As seen in the cross-section, fig. 3, the flues *m* are nearly surrounded by water, thus presenting a very extended steam-generating or fire-surface.

P represents the fire-flue through the two upper sections of the boiler. This flue is formed mainly of the branches radiating from the open central space.

The steam (or steam and water) from the sections beneath passes upward through the orifices I into the spaces R, between the branch flues *q*, where the steam is brought in contact with the sides of the branches, and superheated or dried, ready to be discharged for use.

The method of packing the joints between the sections is represented between the two upper sections, where the packing (in dark color) is seen confined in a groove in the faces of the section.

By adding to the number of the sections above the fire-box, or by diminishing their number, the capacity of the boiler may be increased or diminished, as may be desired.

S is a cap, of conical form, on the upper section, for receiving the smoke and incombustible gases, and discharging them into the smoke-stack.

The boiler may (when circumstances admit) be surrounded by a jacket, of any suitable material, for preventing condensation.

The sections are designed to be cast, each in a separate piece, with the flues, water-spaces, and communicating orifices entire.

Each section is faced up in a lathe, with the packing-grooves turned therein, either in one or both faces forming the joints. As none of the joints are exposed to the fire, a simple elastic packing, without the protection of the groove, may perhaps be found sufficient.

It will thus be seen that a very large fire-surface is secured by this arrangement of flues.

Where the generation of steam is not the particular object, the boiler may be used to the best advantage for heating water for domestic or other purposes.

It will be seen that the base-burning principle is se-

cured by this arrangement of the fire-box, magazine, and the flues *m*.

It will be seen that the gasket or elastic packing, to form the joints between the sections, will be provided with orifices to correspond with the water-orifices *n*, so that each passage-way from one section to another will be separately packed, whether the packing is confined in a groove or not.

Having thus described my invention,

I claim as new and desire to secure by Letters Patent—

1. The steam and water-sections, constructed with the central branching-flue, water-spaces, and intercommunicating orifices, substantially as shown.

2. The water-sections, constructed with the flues *m m*, the intercommunicating orifices, and the central magazine-space I.

3. The combination of the sections above named with a fire-chamber, supplied with fuel from a base-burning magazine, substantially as shown.

ORLANDO CLARKE.

Witnesses:

GEO. W. MABEE,

ALEX. F. ROBERTS.