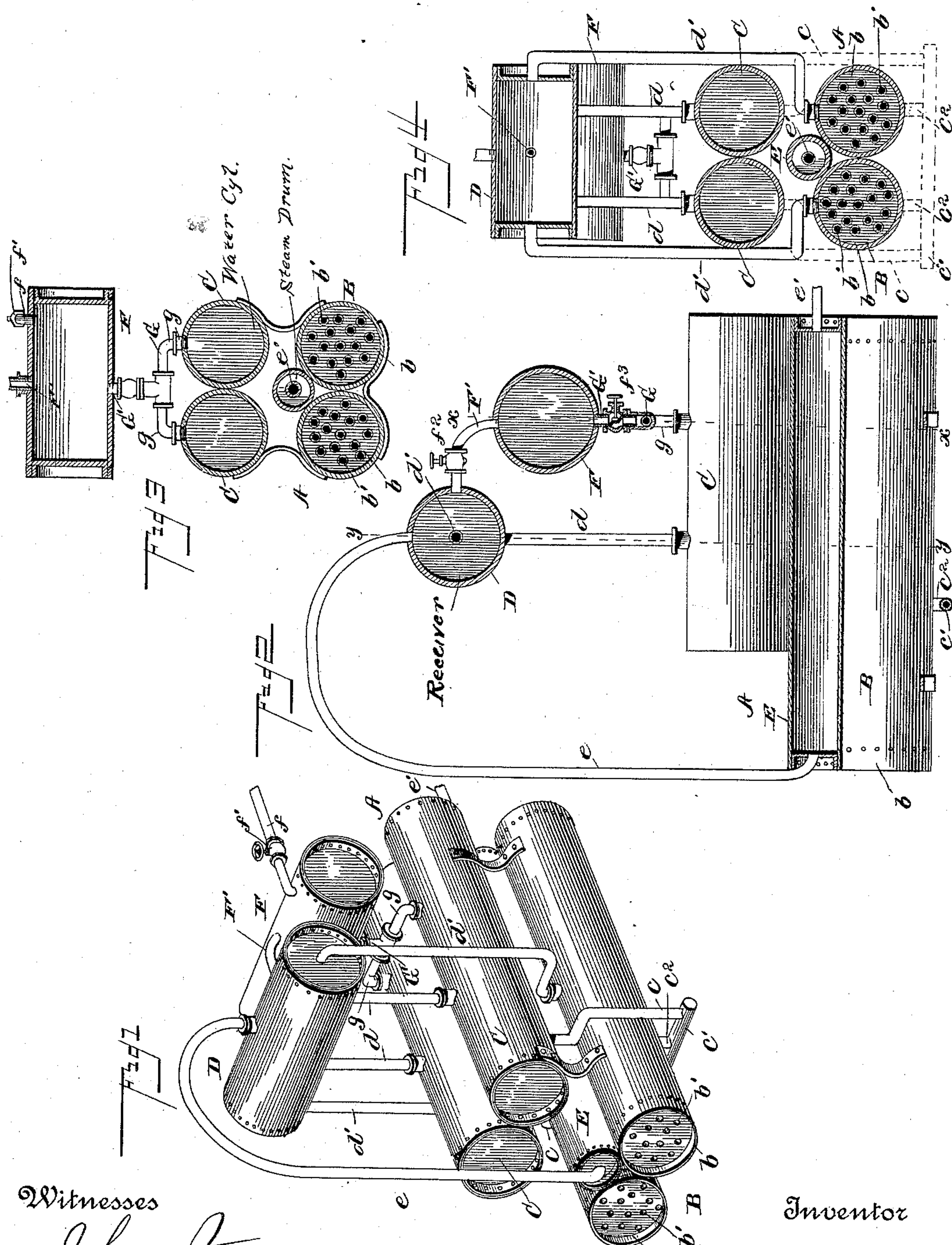


(No Model.)

S. S. FLEMING.
STEAM GENERATOR.

No. 445,760.

Patented Feb. 3, 1891.



Witnesses

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SAMUEL S. FLEMING, OF SARVERSVILLE, PENNSYLVANIA.

STEAM-GENERATOR.

SPECIFICATION forming part of Letters Patent No. 445,760, dated February 3, 1891.

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To all whom it may concern:

Be it known that I, SAMUEL S. FLEMING, a citizen of the United States, residing at Sarversville, in the county of Butler and State of Pennsylvania, have invented certain new and useful Improvements in Steam-Generators; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to steam-generators of that class employing sectional boilers; and it has for its object to provide a generator embodying simple and improved means for effectively supplying water thereto while the same is in use, in which the boiler-sections are readily connected or separated for the purpose of transportation or for increasing or diminishing the number of sections in accordance with the power required, and which will furthermore possess advantages in point of simplicity and inexpensiveness in construction, durability, and general efficiency.

In the drawings, Figure 1 is a perspective view of a generator embodying my invention. Fig. 2 is a vertical longitudinal sectional view. Fig. 3 is a vertical transverse sectional view on the line xx , Fig. 2. Fig. 4 is a similar view on the line yy , Fig. 2.

Corresponding parts in the figures are denoted by the same letters of reference.

Referring to the drawings, A designates the generator mounted in any suitable or preferred manner upon masonry, which is provided with a fire-box. (Not shown.)

B designates the boiler, which is formed by two or more horizontally-disposed independent tubular sections b , provided with the usual boiler-tubes b' .

Above the boiler-sections b are disposed two or more water-cylinders C C, extending parallel with the boiler-sections, and from the rear end of the latter nearly to the front end thereof. These cylinders C are connected with the boiler-sections by tubing c , which in turn are connected with a horizontal tube c' , disposed transversely under the front end of the boiler-sections and connected with the bottom thereof by short connecting-tubes c^2 , the tubes c tapping the water-cylinders at or near the under side.

D designates a receiver, disposed transversely with relation to the water-cylinders some distance above the same and connected therewith by tubes d , respectively entering the bottom and top of the receiver and water-cylinders. Pipes d' connect the boiler-sections at the top with the center of the receiver.

Inclosed between the boiler-sections and the water-cylinders is a dry-steam drum E, approximately the same length as the latter. A pipe e connects the top of the receiver D with the rear end of this drum, while the front end of the drum is provided with a steam-supply pipe e' leading to the engine. The steam-drum being disposed, as it is, in close proximity to the fire, the dry steam is further heated prior to its exit therefrom.

Disposed transversely above the water-cylinders C, in rear of the receiver D, and at a plane lower than the latter, is an auxiliary water-cylinder F, provided with a feed pipe or opening f , having a valve f' . The cylinder F is connected with the receiver by a pipe F' entering the top of the former and the side of the latter at about its vertical center, said pipe being provided with a valve f^2 . Communication is also afforded between the water-cylinders C and F by means of a transversely-disposed horizontal pipe G, having downward end extensions g , which enter the top of the cylinders C, and a short connecting-pipe G' between the pipe G and the bottom of the cylinder F. The pipe G' is provided with a valve f^3 , the purpose of which will hereinafter appear.

The operation is as follows: The boiler-sections are filled with water, and also the water-cylinders C, if desired, though the latter is not essential. The heat is conducted rearwardly under the boiler, and thence forwardly through the boiler-flues, from the front ends of which the smoke and products of combustion are carried off by a suitable stack or flue. (Not shown.) As the water boils in the boiler, it is thrown up, together with the steam generated, through the pipes d' into the receiver D. The steam is then separated from the water and is carried by the pipe e to the drum E, where it is further heated, and then conveyed to the engine. The water thrown with the steam into the

receiver is then caused by gravity and the pressure of the steam to pass through the pipes d into the receivers C and through the pipe F' to the auxiliary cylinder F. From the latter the water also passes into the cylinders C through the pipes G and G', (it being of course understood that the valves f^2 and f^3 are open,) and from the cylinder C the water is conveyed back to the boiler-sections by the pipes c , c' , and c^2 . When it is desired to supply water to the generator the valves f^2 and f^3 are closed and the valve f' opened. The cylinder F is thus cut off from communication with the other parts of the generator, when it may be filled with water without interfering with the operation of the generator, and in any suitable manner without the aid of an injector, pump, or other specific construction of feeder. After the cylinder F has been filled the valve f' is closed and the valves f^2 and f^3 are opened. The pressure of the steam admitted from the receiver to the cylinder F forces the water from the latter into the cylinders C, from whence it passes into the boiler-sections, as before described.

The advantages of my invention will be readily apparent to those skilled in the art to which it appertains. By constructing the boiler of small tubular sections the surface subject to a given pressure is greatly reduced, thereby enhancing the safety of the boiler, while sections may be added thereto to secure additional power in lieu of substituting an entirely new boiler, as is generally the case. The sections are also adapted to be taken apart, and thus more readily transported from one place to another. It may be further noted that by the employment of the improved means herein shown and described for supplying water to the boiler injectors, pumps, and other means for accomplishing this purpose are entirely dispensed with, while in the present construction water may be fed to the boiler without affecting its continuous use.

I claim as my invention—

1. In a steam-generator, the combination, with a boiler formed of two or more independent and separable sections, of a steam-drum, a receiver communicating with the latter and the boiler, a water-cylinder provided with a feed-water inlet and with a valve for controlling the latter, said cylinder having communication with the receiver, and valves for breaking such communication, substantially as and for the purpose set forth.

2. In a steam-generator, the combination, with a boiler formed of two or more independent and separable sections, of a steam-drum disposed adjacent thereto, a receiver having

an inlet-pipe communicating with the top of each of the boiler-sections and return communication with the bottom of the latter, and a pipe connecting the receiver with the steam-drum and adapted to convey steam from the former to the latter, substantially as and for the purpose set forth.

3. In a steam-generator, the combination, with a boiler formed of two or more independent and separable sections, of a receiver having independent communication with the top of each boiler-section, and a water cylinder or cylinders having independent communication with the bottom of each of said boiler-sections and with the receiver, substantially as and for the purpose set forth.

4. In a steam-generator, the combination of a boiler formed of two or more independent sections, a water cylinder or cylinders disposed on a higher plane than the boiler and communicating with the bottom thereof, an auxiliary water-cylinder disposed on a higher plane than said cylinders and having communication therewith, a steam-drum provided with an outlet, and a receiver disposed on a higher plane than the main and auxiliary water-cylinders and having communication therewith and with the boiler and steam-drum, substantially as and for the purpose set forth.

5. In a steam-generator, the combination, with the boiler, main water cylinder or cylinders, receiver, and steam-drum, of an auxiliary water-cylinder connected with the receiver and main water cylinder or cylinders by pipes, valves in said pipes, a feed-water inlet for said auxiliary cylinder, and a valve for closing the same, substantially as set forth.

6. In a steam-generator, the combination of a boiler, a main water cylinder or cylinders disposed above the same and communicating therewith near its bottom, an auxiliary water-cylinder disposed above said cylinder or cylinders and connected therewith by pipes, a valve for closing the latter, said auxiliary cylinder being provided with a feed-water inlet controlled by a valve, a steam-drum provided with an outlet, a receiver communicating with the main water-cylinders and with the auxiliary water-cylinder by pipes, the latter pipes being provided with a valve, a pipe or pipes connecting the boiler with the receiver, and a pipe connecting the latter with the steam-drum, substantially as and for the purpose set forth.

In testimony whereof I affix my signature in presence of two witnesses.

SAMUEL S. FLEMING.

Witnesses:

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