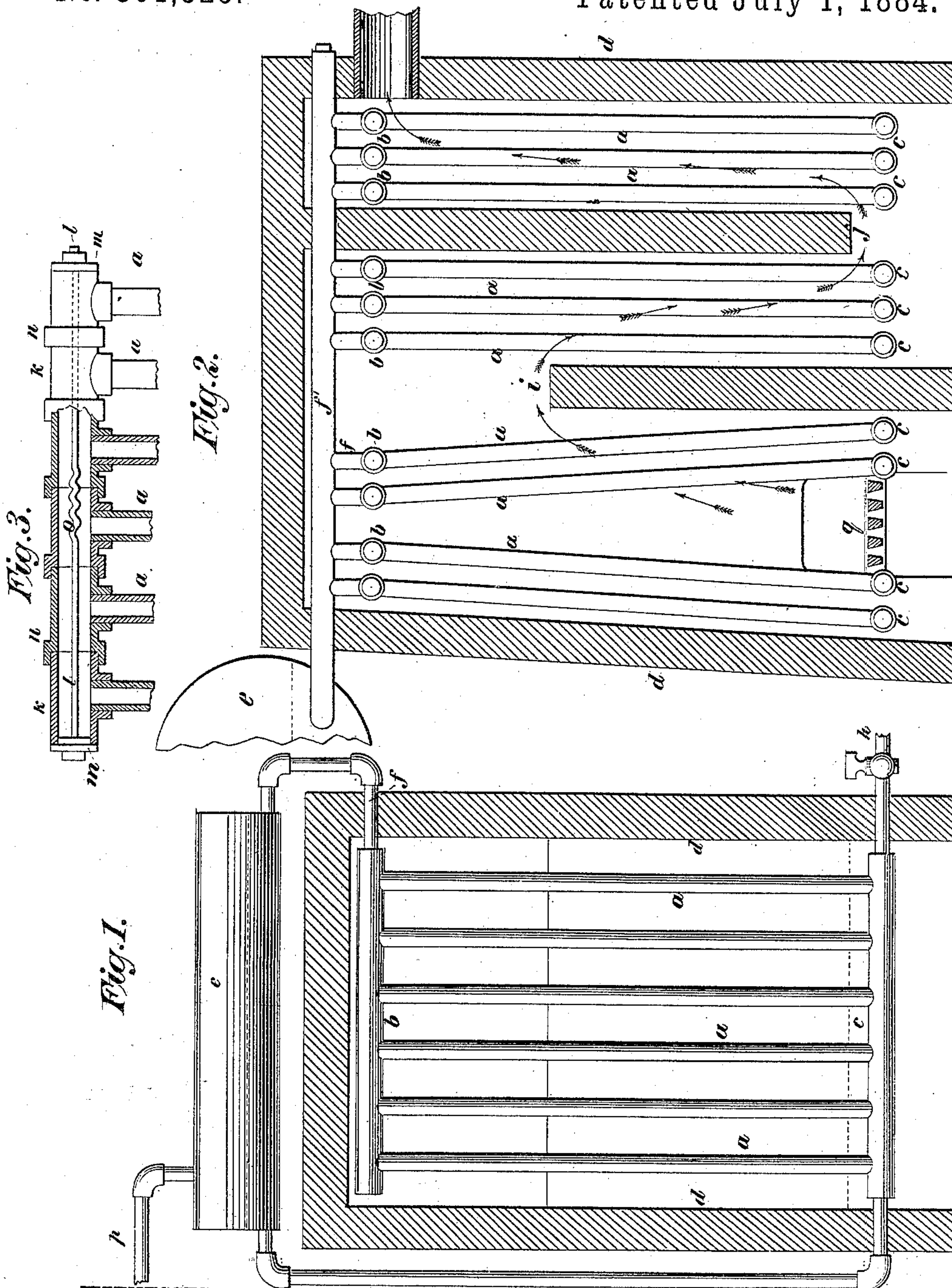


(No Model.)

J. W. BAILEY.  
STEAM GENERATOR.

No. 301,325.

Patented July 1, 1884.



WITNESSES:  
*Gustave Diesterich*  
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# UNITED STATES PATENT OFFICE.

JAMES W. BAILEY, OF MONMOUTH, ILLINOIS.

## STEAM-GENERATOR.

SPECIFICATION forming part of Letters Patent No. 301,325, dated July 1, 1884.

Application filed February 8, 1884. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES W. BAILEY, of Monmouth, in the county of Warren and State of Illinois, have invented a new and Improved Steam-Generator, of which the following is a full, clear, and exact description.

My invention consists of a steam-generator designed more particularly for steam-heating purposes, but applicable for other purposes also, and contrived in an improved arrangement for efficient circulation, and contrived in a novel sectional arrangement whereby the circulation of the water diminishes or wholly ceases in the parts remote from the fire when the fire is low, while the circulation continues in the vicinity of the fire and steam generates thereabout in greater measure than if the part near the fire were cooled by circulation from the more distant and cooler parts of the boiler, thus enabling the steam production to be more uniform under varying conditions of the fire, and also more economical when the fire is low.

My invention also consists in the construction and arrangement of parts, as will be hereinafter described and claimed.

Reference is to be had to the accompanying drawings, forming part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a sectional elevation of my improved generator, showing the arrangement I have contrived for the circulation generally. Fig. 2 is a sectional elevation of the generator, showing my improved arrangement for sectional circulation; and Fig. 3 is a detail, partly in side view and partly in section, of the improved arrangement that I propose for connecting the cross-tubes to the ends of a series of parallel tubes.

To a series of vertical, inclined, or horizontal tubes, *a*, connected at the ends to the cross-tubes *b* and *c*, respectively, in rectangular frames, and arranged within the furnace-walls *d* of the furnace, for being heated for the purpose of generating steam, I connect a drum, *e*, or steam-dome, located suitably above the tubes, to be partly filled with water to facilitate the separation of the steam from the surface of the water, by a hot-water pipe, *f*, and a return-pipe, *g*, the said pipes being connected at diagonally-opposite corners of the

series of tubes, and at the top and bottom, respectively, with a blow-off connection, *h*, at the end of the lower cross-tube, *c*, opposite to the cold-water pipe *g*. Any number of these frames of parallel and cross pipes *a b c* may be arranged side by side in the furnace, with their pipes *f*, connected to a horizontal pipe, *f'*, discharging into the drum *e*, and with the pipe *g*, connected to a similar horizontal pipe discharging into the cross-tubes *c*. From the drum *e* the steam is to be conducted away to the radiators or other device where it is used by the pipe *p*. It will be seen that in this contrivance of the heating-tubes the most efficient circulation of the water will be effected, and any sediment depositing in the tube *c* may be readily blown out through the cock *h* whenever it may be required.

For effecting the sectional circulation as I propose, I separate these series of heating-tubes into sections, as represented in Fig. 2, and locate a bridge-wall, *i j*, and so on between the sections, to cause the heat to traverse the sections upward and downward successively from the fire-grate *q*, in a manner best calculated to increase the length of the "run" of the heat, and so that the heat will take effect on said sections in proportion to the distance from the fire and to the cooling effect of the tubes on the heat passing along them, whereby, when the fire is low, the heat will be concentrated in the locality of the fire-bed, and thus will continue to heat the tubes in that part sufficiently to generate steam, while the remoter parts will be but little heated, and consequently will not cause much circulation through them at the same time that a lively circulation will be maintained in the more heated section, and the development of steam in the drum will not be materially retarded by much return flow of water from the colder parts of the generator.

In order to connect these cross and parallel tubes more readily than by the common right and left hand screw-threaded connections, I propose to make them of sections *k*, into which the tubes *a* may be screwed or otherwise connected separately, and which may be connected together end to end by a long bolt, *l*, passing through all the sections and through a cap, *m*, at each end, each section *k* having one socket,



*n*, and one plain end to receive the plain end of another section in its socket and to enter by its plain end into the socket of another section; and, to compensate for the unequal expansions of the rod and the tube-sections, I 5 construct the rod with a corrugation or spiral coil, *o*, along a portion of it, which enables said rod to accommodate itself to the movements of the tubes and at the same time to maintain 10 the proper tension by the recoil of the twisted section.

I am aware that a series of socketed tubes have been held together by two hooked rods connected at their hooked ends by a spiral 15 spring, and I do not desire to claim, broadly, any such construction.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

In a multitubular steam-generator having series of frames of parallel and cross tubes *a* 20 *b c*, the said frames separated into two or more sections by bridge-walls *i j*, causing the heat to pass upward and downward successively along the said sections, and said frames connected separately and at the diagonally-opposite 25 upper and lower corners to the water-circulating pipes *f g*, respectively, connecting with the drum for causing the circulation to vary as the heat of the furnace varies, substantially as described.

JAMES W. BAILEY.

Witnesses:

LEVI ROADHOUSE,  
W. J. MCQUISTON.