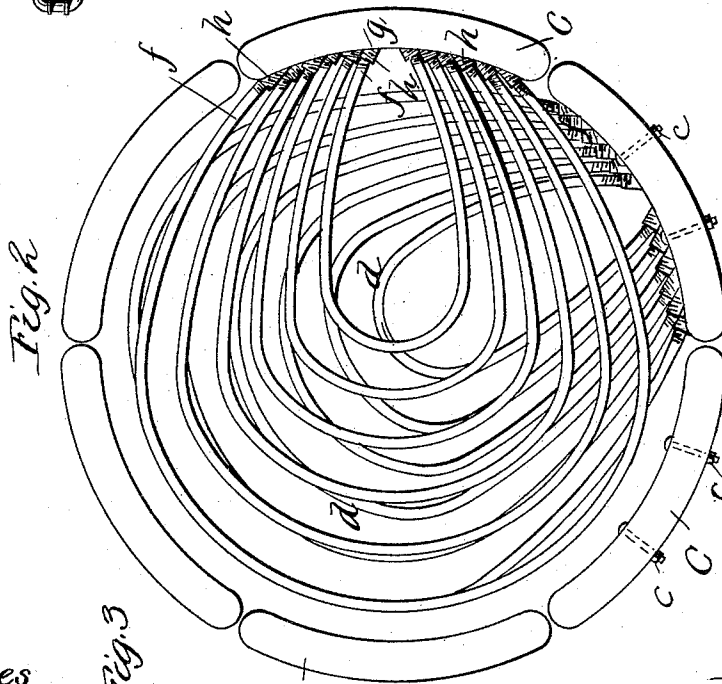
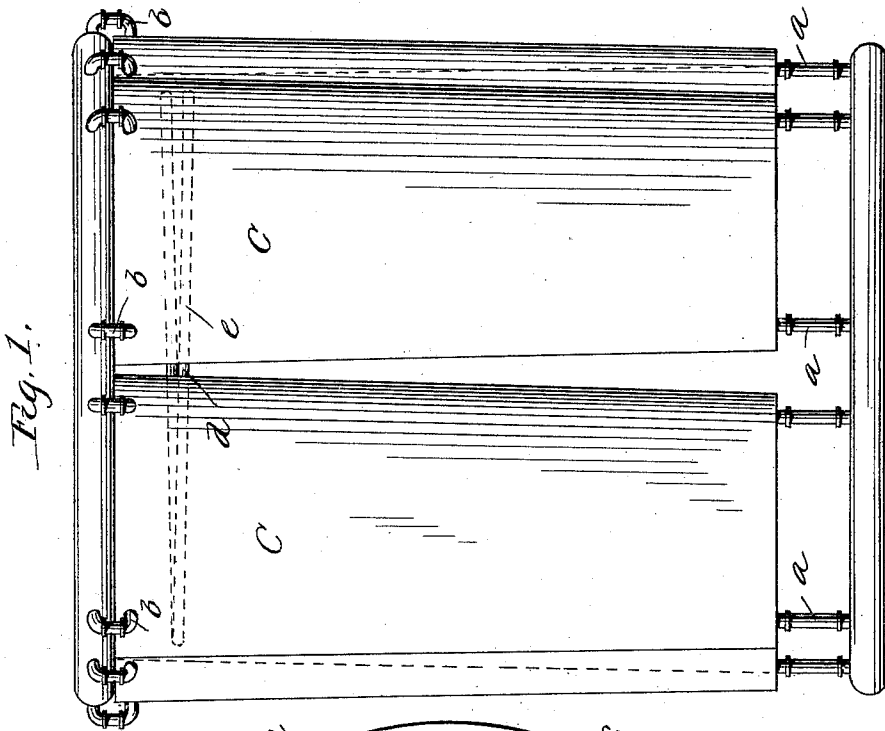


(No Model.)

M. LEVI.
STEAM GENERATOR.

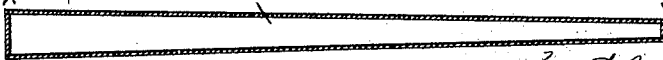
No. 466,695.

Patented Jan. 5, 1892.



Witnesses
F. L. Middleton
W. T. Keene.

Fig. 3



Inventor
M. Levi.

by Ellis Spear
Atty

UNITED STATES PATENT OFFICE.

MORDICAI LEVI, OF CHARLESTON, WEST VIRGINIA.

STEAM-GENERATOR.

SPECIFICATION forming part of Letters Patent No. 466,695, dated January 5, 1892.

Application filed February 12, 1891. Serial No. 381,198. (No model.)

To all whom it may concern:

Be it known that I, MORDICAI LEVI, a citizen of the United States of America, residing at Charleston, in the county of Kanawha and State of West Virginia, have invented certain new and useful Improvements in Steam-Generators, of which the following is a specification.

In an application filed in the United States Patent Office on the 7th day of January, 1890, Serial No. 336,127, I have shown a steam-generator provided with a series of water columns of inverted-cone shape interposed between the mud-drum and steam-drum with circulating-tubes between the columns extending across the space encircled by the columns, the object of the cone-shaped columns being to prevent priming and consequent superheating of the steam, which often results to such an extent as to be injurious to the apparatus.

In the present invention, while retaining the columns of inverted-cone shape for the same purpose, I seek to secure the more rapid generation of steam by enlarging the heating-surface and reducing the diameter of the columns, flattening them out in segmental shape, thus presenting a maximum amount of heating-surface with an approximately thin column of water.

A further object in the present invention is to arrange the circulating-tubes in series, each column supporting entirely its own series, thus permitting of the independent handling of each column and the circulating-tubes carried thereby.

In the accompanying drawings, Figure 1 represents an elevation of the column, showing the mud and steam drums, it not being deemed necessary to show the outer shell, the grate, and ash-pit. Fig. 2 is a top view illustrating the arrangement of circulating-tubes. Fig. 3 is a sectional view through one of the columns, taken lengthwise across its narrower part.

In the figures I have only shown the parts of the generator to which my improvements directly relate, the parts omitted being of well-known or improved construction.

In the present case the mud-drum and steam-drum may be the same as in my apparatus re-

ferred to or of ordinary construction. The water columns are shown at C, and are flattened tubes in segmental shape, the curve conforming to the general curvature of the boiler-shell. These columns are preferably larger at the top than at the bottom to prevent priming, as explained in my former application. The mud-drum is connected to the columns by short sections of pipes *a*, two being shown for each column; but one or more may be used. The steam-drum is in connection with the columns through communicating pipes *b*, as shown, one or more of which may be used. The columns preferably taper in the direction of both diameters, as shown in Figs. 1 and 3. They are preferably strengthened at the top or upper portion by rods or bolts passing from one side to the other of the column, as shown at *c*. Instead of extending the circulating-pipes between columns, as in my application heretofore mentioned, I have devised an arrangement of these tubes whereby I am enabled to make each column independent of the others, and providing a series of circulating-tubes for each column entirely supported by each column and capable of removal with said column, so that in the setting up of the generator or the repair of the same a column may be fitted with its circulating-pipes and then placed in position or withdrawn for repair without disturbing but one other column and its pipes. I attain this end by making the circulating-pipes of approximately U shape, and form them in a nest one within the other, as shown at *d*, the ends of each series of pipes being connected to one column in a line slightly inclined, as shown at *e*, giving a fall of about two inches from one end to the other to promote free circulation. The next series is arranged below or above the first, and to the next or adjoining column, and so on, with as many series of circulating-pipes as there are columns.

I do not limit myself as to the manner of attaching the tubes to the columns, but prefer to screw the ends *f* into screw-threaded sockets *g*, projecting from the columns, and the opposite ends I fit to a threaded nipple or socket, *h* which has an interior right-hand thread fitted to receive the threaded end of

the tubes, while the outer periphery of the nipple is provided with a left-hand thread fitting a corresponding thread in the sockets projecting from the column. By the use of this intermediate nipple as it is turned into the threaded socket of the column, having first been engaged with the threaded end of the pipe, the same movement will screw up the pipe end into place. This is a very convenient manner of connecting the tubes and renders unnecessary the man-holes required in my former construction.

I claim as my invention—

1. A steam-generator having a series of water columns, said water columns inclosing circulating-pipes, which communicate directly with said columns, the columns being segmental or of flattened shape in cross-section and combined with a mud and steam drum, substantially as described.

2. A steam-generator having water columns of segmental shape in cross-section and taper-

ing downwardly, combined with circulating-pipes and a mud and steam drum, substantially as described.

3. A steam-generator having tapering water columns of segmental shape in cross-section, and a series of circulating-tubes connecting with each column, substantially as described.

4. In combination with the water columns of a steam-generator, of segmental or flattened shape in cross-section, a series of U-shaped circulating-tubes arranged horizontally in nested form, each series connecting at each end with the same column, substantially as described.

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

MORDICAI LEVI.

Witnesses:

HENRY E. COOPER,
MARGARET V. COOPER.