

(No Model.)

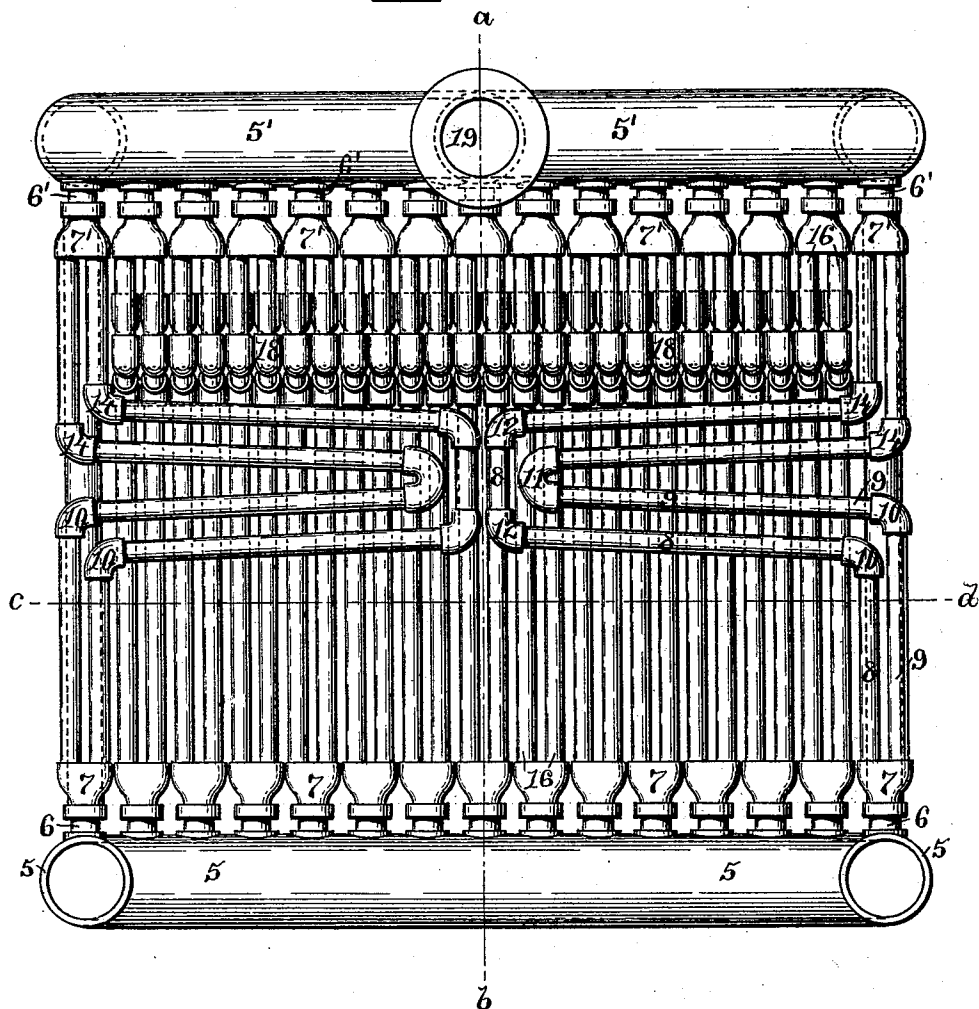
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D. ALMY.
STEAM GENERATOR.

No. 459,538.

Patented Sept. 15, 1891.

Fig. 1.



WITNESSES:

Henry J. Miller
Chas. H. Luther Jr.

INVENTOR:

Darwin Almy
Joseph A. Miller & Co.
Attys.

(No Model.)

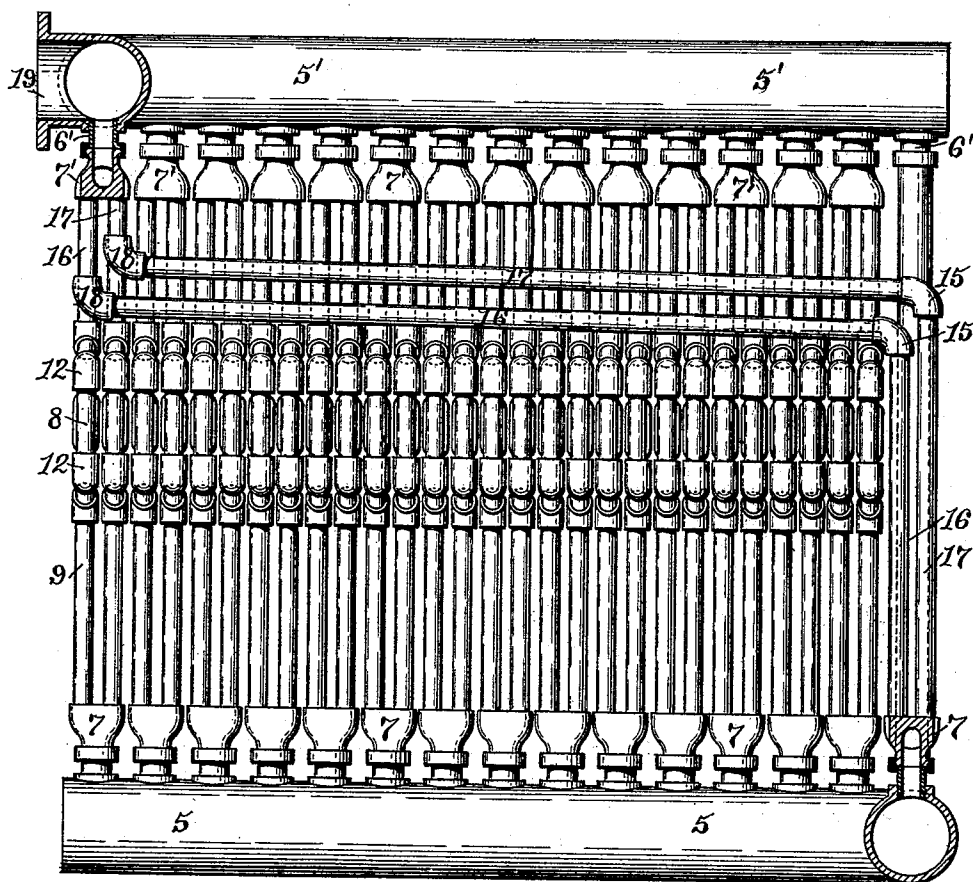
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D. ALMY.
STEAM GENERATOR.

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Patented Sept. 15, 1891.

Fig. 2.



WITNESSES:

Henry J. Miller
Chas. H. Luther Jr.

INVENTOR:

Darwin Almy
By Joseph A. Miller & Co.
Atty.

(No Model.)

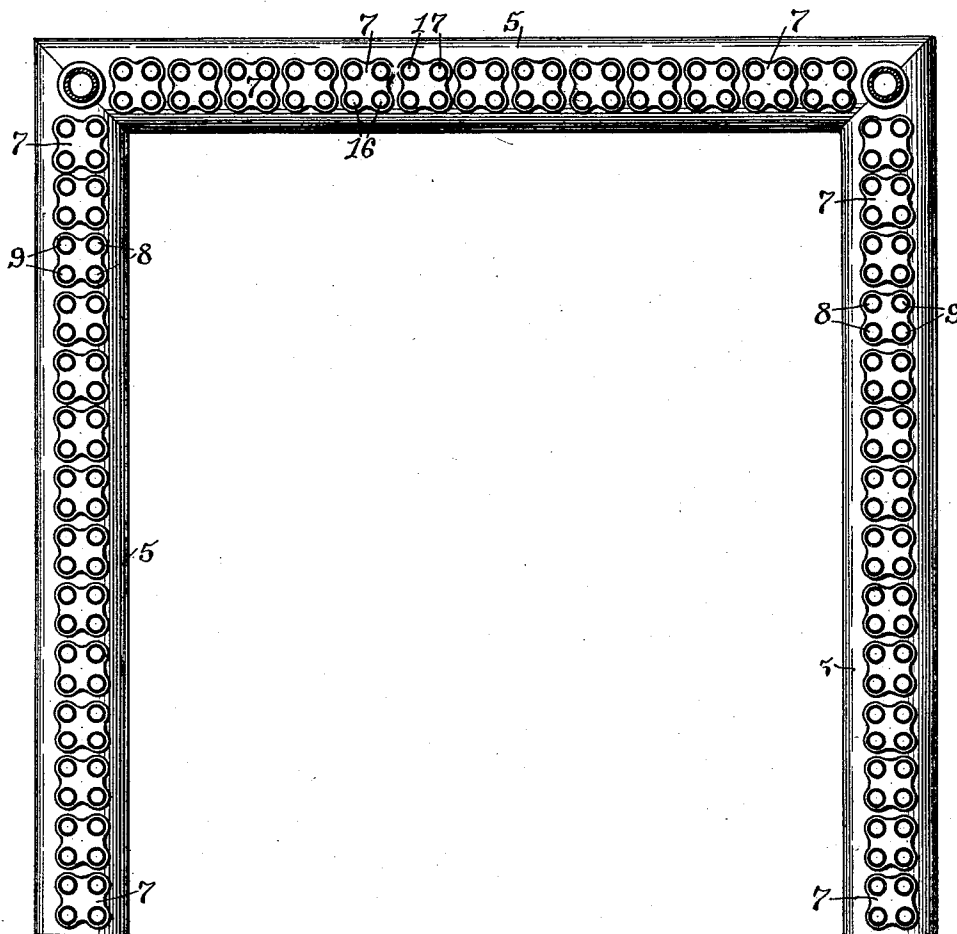
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Fig. 3.



WITNESSES:

Henry J. Miller
 Char. H. Luther Jr.

INVENTOR:

Darwin Hing
 & Joseph A. Miller & Co.
 Attys.

UNITED STATES PATENT OFFICE.

DARWIN ALMY, OF PROVIDENCE, RHODE ISLAND.

STEAM-GENERATOR.

SPECIFICATION forming part of Letters Patent No. 459,538, dated September 15, 1891.

Application filed September 22, 1890. Serial No. 365,799. (No model.)

To all whom it may concern:

Be it known that I, DARWIN ALMY, of the city of Providence, in the county of Providence and State of Rhode Island, have invented a new and useful Improvement in Steam-Generators, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

This invention has reference to an improvement in the construction of the class of steam-generators known as "water-tube boilers."

The invention consists in the peculiar and novel construction by which two sets or sections of the steam-generator pipes are united at each end in one fitting and connected with the water and steam manifolds, as will be more fully set forth hereinafter.

The invention further consists in the peculiar arrangement of the pipes or tubes inclosing the fire-box, as more particularly pointed out hereinafter.

The object of the invention is to simplify the construction of water-tube steam-generators, increase the heating-surface surrounding the fire-box, and facilitate the insertion, removal, and repairs of the sections of which the same is formed.

In the drawings similar numbers of reference indicate corresponding parts.

Figure 1 is a vertical cross-section of my improved steam-generator. Fig. 2 is a vertical cross-section of the same at the line *a b*.

Fig. 3 is a horizontal view of the water-multiple, showing the four-branch fittings.

The steam-generator is formed of a series of sections, of which there are two kinds, one for forming the two sides and crown of the fire-box and the other for forming the rear of the fire-box. The side sections consist each of four pipes. The two forming the sides of the fire-box are indicated by the number 8, and the two forming the outside row of the boiler parallel with the inner pipes are designated by the number 9. The four pipes 8 and 9 are screwed into the lower four-branch fitting 7. They extend vertically to the elbows 10, from which the pipes 8 and 9 extend over the furnace-space toward the middle of the boiler, the pipes 8 connecting with the elbows 12, the other end of which elbows

are connected by the short vertical pipes 8 with the elbows 13, from the other ends of which elbows the pipes 8 extend horizontally or nearly horizontally to the elbows 14, from the other end of which elbows 14 the pipes 8, forming the upper vertical part of each section, connect with the upper four-branch fitting 7', thus forming a loop extending over the fire of the furnace. The horizontal, preferably inclined, pipes 9 connect the elbows 10 with the bent fittings 11, from the other ends of which they extend horizontally, also preferably on an incline, to the outer elbows 14, and from them the pipes 9 extend vertically to the upper four-branch fitting 7', the whole forming a section consisting of four vertical pipes and four loops extending over the furnace nearly to the middle of the same, having at each end a four-branch fitting. These sections, owing to the looped construction, have sufficient elasticity to permit of connecting the lower four-branch fitting with the water multiple or manifold 5 by means of the nipple 6 or by any other coupling device and of connecting the upper four-branch fitting by means of the nipple 6' with the steam multiple or manifold 5', and when subjected to the heat of the fire of the furnace are free to expand without any strain on the pipes, elbows, or fittings. The sections can be quickly removed for repairs, if required, and as quickly inserted and secured. They secure a free upward circulation of the water through all the pipes of each section and form efficient steam-generating surfaces exposed to the heat of the fire. The second set of sections, forming the rear of the furnace, consist also each of four pipes connected with one of the four-branch fittings 7 at the lower end. These pipes extend vertically to a point above the loops of the side sections, where they are connected with the elbows 15, and from these the pipes, which are designated by the number 16 for the inner and 17 for the outer pipes, extend horizontally and at right angles to the loops of the side pipes to the front of the boiler, where by means of the elbows 18 and short vertical pipes they are connected with the upper branch fitting 7', thus forming sections of four pipes extending vertically to form the rear of the furnace, and then over the loops to the front, connected

to the water multiple or manifold at the lower end and to the steam-multiple at the upper end. To permit of this elastic construction of the rear sections, the water and steam multiples are reversed, so that the open end of the water-multiple 7 being at the front of the steam-generator the steam-multiple 7' has its open end in the rear of the generator, and is provided at the front end with the flanged outlet 19, to which the steam-dome or steam-separator is secured.

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

1. The herein-described section, forming part of a water-tube steam-generator, the same consisting each of four vertical pipes formed into four loops extending horizontally from each side toward the center over the furnace, the vertical ends connected at the bottom and top with a four-branch fitting adapted to be secured to the water and steam multiples and form the sides and crown of the furnace, as described.

2. The herein-described sections, forming part of a water-tube steam-generator, consisting each of eight vertical pipes and four horizontal pipes, forming with the vertical pipes continuous water-ways, connected at the ends with four-branch fittings, and adapted to be secured to the water and steam multiples and forming the rear of the furnace, as described.

3. In a water-tube boiler, the combination, with the side sections consisting each of eight vertical pipes and four loops, forming the sides and the crown of the furnace, having at each end a four-branch fitting, and the rear section consisting each of four horizontal pipes connected at the opposite ends by elbow-fittings, and vertical pipes with the four-branch fittings 7, of the steam-multiples 5 and 5' and the nipples 6 and 6', as and for the purpose described.

DARWIN ALMY.

Witnesses

J. A. MILLER, Jr.,
HENRY J. MILLER.