T. P. FRANKE.

Steam-Generator.

No. 203,721. Patented May 14, 1878.

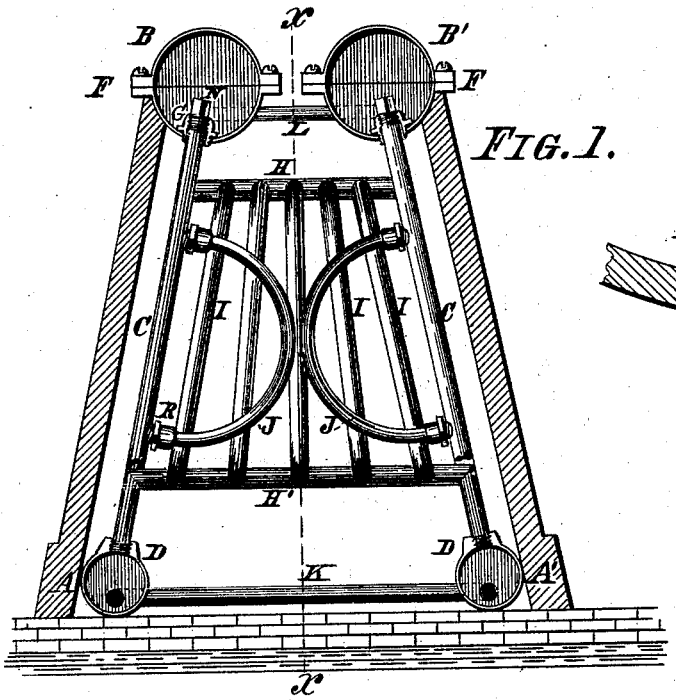


FIG. 1.

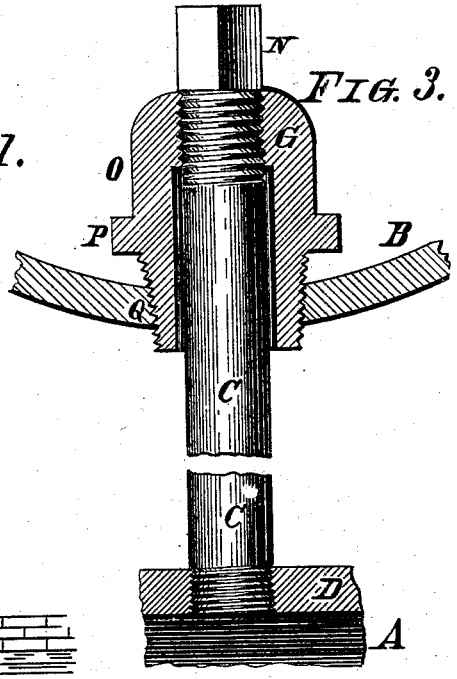


FIG. 3.

FIG. 2.

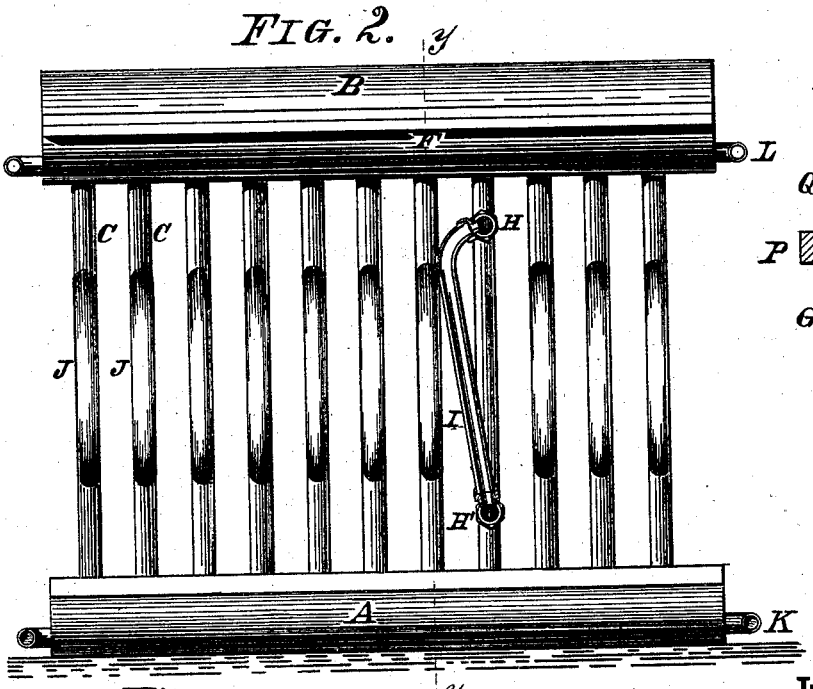
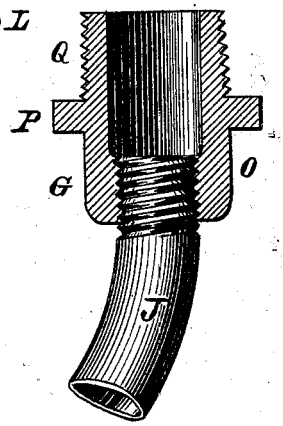


FIG. 4.



Witnesses:

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UNITED STATES PATENT OFFICE.

THEODORE P. FRANKE, OF BUFFALO, NEW YORK, ASSIGNOR OF ONE-HALF HIS RIGHT TO FRANK NOE, OF SAME PLACE.

IMPROVEMENT IN STEAM-GENERATORS.

Specification forming part of Letters Patent No. **203,721**, dated May 14, 1878; application filed March 2, 1878.

To all whom it may concern:

Be it known that I, THEODORE P. FRANKE, of Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements on a Steam-Generator; and I do hereby declare that the following description of my said invention, taken in connection with the accompanying sheet of drawings, forms a full, clear, and exact specification, which will enable others skilled in the art to which it appertains to make and use the same.

This invention has special reference to steam-generators; and it consists in the peculiar arrangement of parts and details of construction, as hereinafter first fully set forth and described, and then pointed out in the claims, said improvements being designed with a view of increasing the capacity of that class of steam-generators known as "tubular boilers," and to enable the ready withdrawal of any one or more of the heating-tubes in case of leakage without disturbing the boiler-setting in any manner.

In the drawings hereinbefore mentioned, Figure 1 is a transverse sectional elevation in line *y y* of Fig. 2. Fig. 2 is a longitudinal sectional elevation in line *x x* of Fig. 1. Figs. 3 and 4 are detail views of my method of connecting the heating-tubes with each other.

Like letters of reference indicate corresponding parts in all the figures.

In steam-boilers constructed essentially of horizontal drums and vertical heating-tubes containing water and steam internally there is a very serious drawback—viz., the inability of removing one or more of the heating-tubes in case of leakage without tearing down a very large portion of the brick setting or other inclosure surrounding the boiler proper.

To avoid this obstacle, I construct my boiler of two horizontal mud-drums, A A′, and two similarly-located steam and water drums, B B′, and connecting them by a series of heating-tubes, C. The lower or mud-drums I prefer to make of cast-iron, with a rise, D, running either over the entire length of the tubes or formed into nipples, one for each individual tube C. These drums may, however, be also made of wrought-iron, properly riveted, and furnished with tapped holes to receive the lower screw-threaded end of said heating-tubes C. The upper or steam and water drums may also be made of either cast or wrought iron; but they should be made in two halves, having flanges F, by means of which and screw-bolts said halves may be secured together to form cylindrical shells.

The lower half of these shells I provide with apertures corresponding in distance apart with those in the mud-drums, but larger in size, to admit the screw-threaded shank of fitting G, within which said heating-tubes C are screwed.

Toward the rear end of the boiler I connect two oppositely-located heating-tubes, C, by two horizontal tubes, H H′, and connect these, in turn, by a series of vertical tubes, I. These tubes I form, or rather answer the purpose of, a bridge-wall in the combustion-chamber, and, instead of absorbing heat without giving an equivalent for the same in steam, as is the case with a brick wall, considerably increase the heating-surface and capacity of the boiler without adding to its exterior dimensions.

To further increase the heating-surface, I provide each heating-tube C in the combustion-chamber with a curved tube, J, connecting said curved tube with the straight tube C by means of the fitting G, hereinbefore mentioned.

The mud as well as the steam and water drums I shall connect on either one or both ends with connecting-tubes K and L, respectively, so as to preserve an equal height of water in both sections under all circumstances.

In fitting this boiler together I shall form the upper end of each heating-tube C into an angular part, N, and form a screw-thread on said tube just below this angular part, and place over this the fitting G, consisting of the bell-shaped part O, wrench-section P, and tapering screw-section Q. The lower ends of these tubes I shall provide with an external screw-thread, corresponding with that on the other end in pitch. Now, in inserting these tubes, I shall pass the same through the aperture in the upper drum B B′ and enter it in the lower drum, having first screwed the fitting G on the upper end. By now turning the tube and fitting, both parts will enter their respect-

ive apertures and form a perfectly tight joint therein.

In screwing a series of tubes into another series at right angles to one another, the greatest difficulty is encountered in getting the threads to match, so that they will screw. It is, in fact, a matter of accident if it does so happen. By means of my fitting G I am enabled to make the threads correspond, because I can screw the fitting until both internal threads—in the present instance that of the fitting and the lower drum—coincide.

This fitting is, therefore, a very essential part of my steam-boiler, and may be used to great advantage in other tubular structures.

The tubes J, as well as I, are secured to the tubes C and H H′ by the same kind of fitting; but in this case I shall provide the shank with a right and the socket with a left thread, or vice versa. The threads in the tubes being similarly arranged, it is evident that screwing on the wrench-section P causes the parts to draw, and thus make ready connection, which may at any time be severed without removing a single part of the exterior casing of the boiler.

To obtain access to the interior of the horizontal tubes, I shall provide them with manholes of suitable size, which will be placed either into the heads or the shells of said drums, so as to avoid breaking the longitudinal joint F for this purpose.

In operation, the boiler is filled with water up to about the center of the drums B B, thus leaving sufficient steam-storing capacity in the upper half to furnish dry steam.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent of the United States—

1. The combination, with the drum B, of the heating-tubes C, provided with the angular wrench-section N, and the fitting G, consisting of the bell-shaped socket O, wrench-section P, and screw-shank Q, as and for the purpose specified.

2. A steam-generator consisting essentially of the horizontal drums A A′ and B B′, heating-tubes C, transverse tubes H H′, with the vertical heating-tubes I and the curved heating-tubes J, said tubes being secured to each other by the fitting G, as and for the use and purpose specified.

3. In a steam-generator having upper and lower drums, the fitting G, having the threaded socket O and shank Q, in combination with the heating-tubes C, having screw-threads on both ends, the matching of the screw-threads being effected by the fitting G, substantially as and for the use and purpose specified.

In testimony that I claim the foregoing as my invention I have hereto set my hand and affixed my seal in the presence of two subscribing witnesses.

THEODORE P. FRANKE. [L. S.]

Attest:

MICHAEL J. STARK,

FRANK NOE.