S. A. HILL & C. F. THUMM.

DEVICE FOR GENERATING STEAM IN STEAM GENERATORS.

No. 95,687. Patented Oct. 12, 1869.

Fig. 2

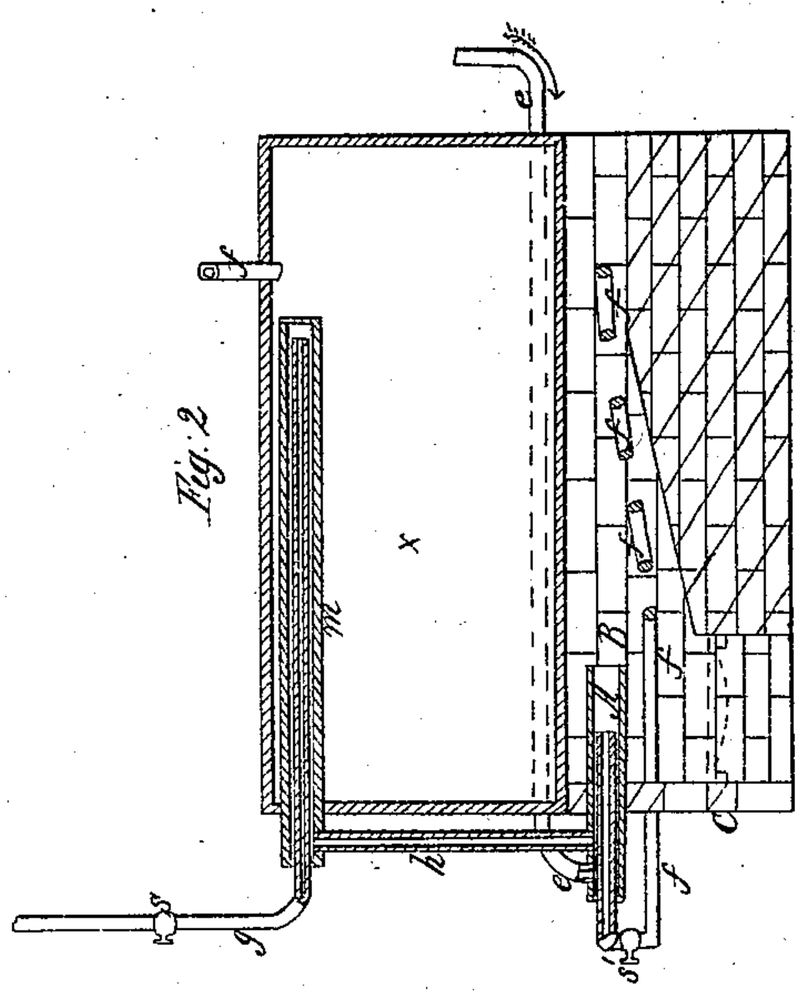
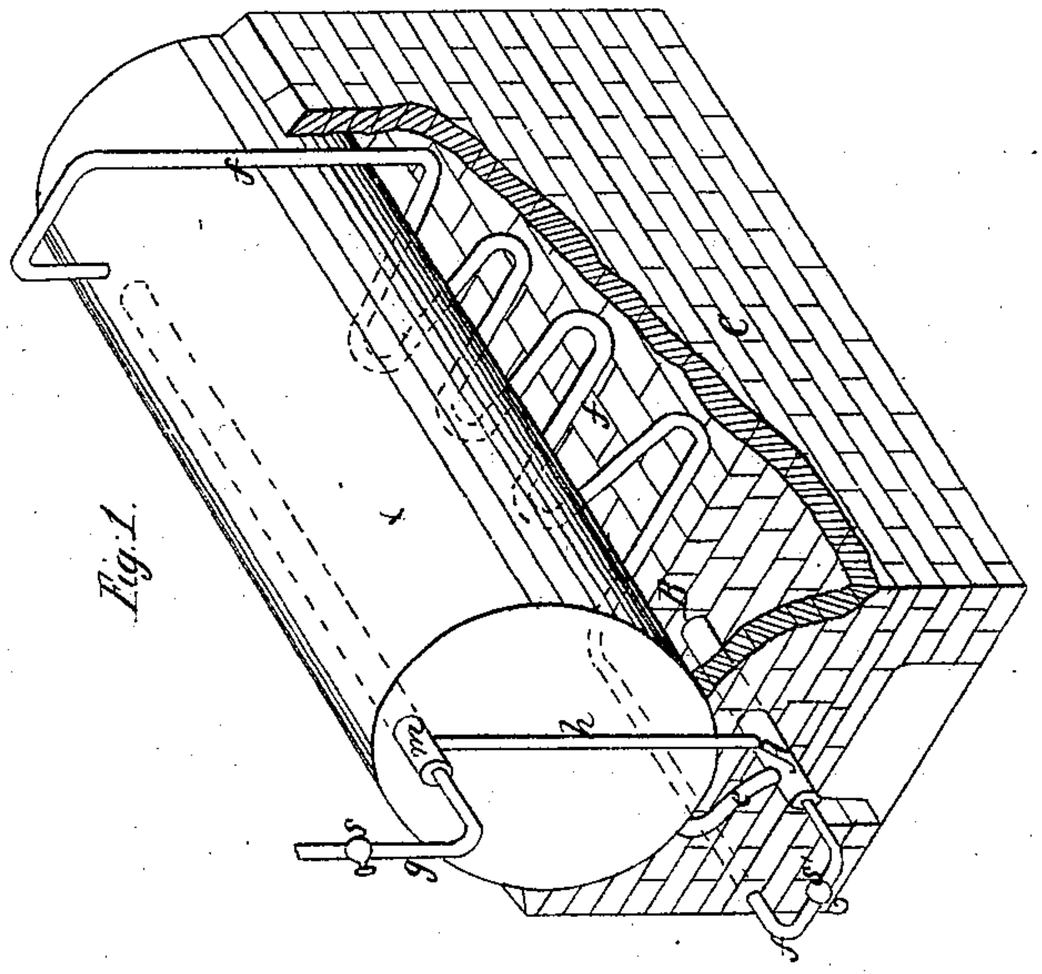


Fig. 1.



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United States Patent Office.

SAMUEL A. HILL AND CHARLES F. THUMM, OF OIL CITY, ASSIGNORS TO THEMSELVES AND OLIVER P. SCAIFE, OF PITTSBURG, PENNSYLVANIA.

Letters Patent No. 95,687, *dated October* 12, 1869.

IMPROVEMENT IN DEVICES FOR GENERATING STEAM IN STEAM-GENERATORS.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that we, SAMUEL A. HILL and CHARLES F. THUMM, both of Oil City, in the county of Venango, and State of Pennsylvania, have invented a new and useful Improvement in Apparatus for Generating Steam; and we do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

The nature of our invention consists in so constructing the apparatus, hereinafter described, that heated hydrocarbon, heated air, and superheated steam are mixed and commingled together, so as to form a gaseous or vaporous fuel for generating steam.

To enable others skilled in the art to make and use our invention, we will proceed to describe its construction and operation.

In the accompanying drawings, which form part of our specification—

Figure 1 is a perspective view of our improvement in apparatus for generating steam, and represents a portion of the furnace-wall broken away, for the purpose of showing the arrangement of the pipe for superheating the steam.

Figure 2 is a longitudinal and vertical section of our improvement in apparatus for generating steam.

In the accompanying drawings—

C represents the masonry-work of the furnace, which is of ordinary construction.

X represents a boiler for generating steam.

In the front end of the boiler X is fitted a pipe or tube, *m*, inside of which is arranged a pipe, *g*, so that a space is left between the inside of the tube *m* and outside of pipe *g*.

To the tube *m* is attached a pipe, *h*, which is also attached to the chamber A, a part of which extends into the fire-chamber of the furnace of the boiler.

Inside of chamber A is fitted a portion of the steam-pipe *f*, the outlet of which projects beyond the point where the pipe *h* connects with the chamber A, and from chamber A enters the fire-chamber, traverses from side to side in the heat-chamber, and passing up at the back end of the furnace, is connected to the upper side of the boiler X.

To the chamber A is attached a pipe, *e*, which passes back along one side of the heat-chamber, and out at the back end of the furnace.

The pipes *f* and *g* are provided with valves, as indicated at S and S′.

The skilful mechanic will readily understand the construction and arrangement of the several parts of our improvement, and the relation they bear to each other, by reference to the accompanying drawings, and from the foregoing description; we will, therefore, proceed to describe its operation, which is as follows:

The pipe *g* being attached to a reservoir containing hydrocarbon-oil, a fire is made in the chamber B of the furnace, and steam generated in the boiler X, and when the desired pressure of steam is obtained, the valve *s* in pipe *g* is opened so as to allow a very small stream of the hydrocarbon-oil to flow through the pipe into the tube *m*, which has become heated by the steam in the boiler, and the oil coming in contact with the heated surface of the tube *m*, will become heated, and flowing back through it to the pipe *h*, flows down it into chamber A.

The valve S′, of the steam-pipe *f*, is then opened, which will allow steam, which is superheated in pipe *f*, to pass into chamber A, and thereby cause a current of air to be drawn through pipe *e* into the chamber A.

This current of air, which is heated in its passage through the pipe *e*, coming in contact with the heated oil as it flows from pipe *h*, mixes with it, and these mixed elements being drawn forward by the current of steam passing out at the end of pipe *f*, they become mixed with the superheated steam, forming an active current of vaporous or gaseous matter, which passes from chamber A into the fire-chamber B of the furnace, where it is ignited, causing a vivid combustion with an intense heat, which is used for generating steam.

Having thus described the nature, construction, and operation of our improvement,

What we claim as of our invention, is—

1. The construction and arrangement of the herein-before-described devices, for commingling in chambers A and B heated hydrocarbon, heated air, and superheated steam, so as to form a gaseous or vaporous admixture for burning, substantially as herein described.

2. The combination of the pipes *e*, *f*, *g*, and *h*, and chambers A and B, constructed, arranged, and operating substantially as herein described.

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