G. K. STEVENSON.

RETORT FURNACE FOR STEAM-BOILERS.

No. 185,052. Patented Dec. 5, 1876.

Fig. 2.

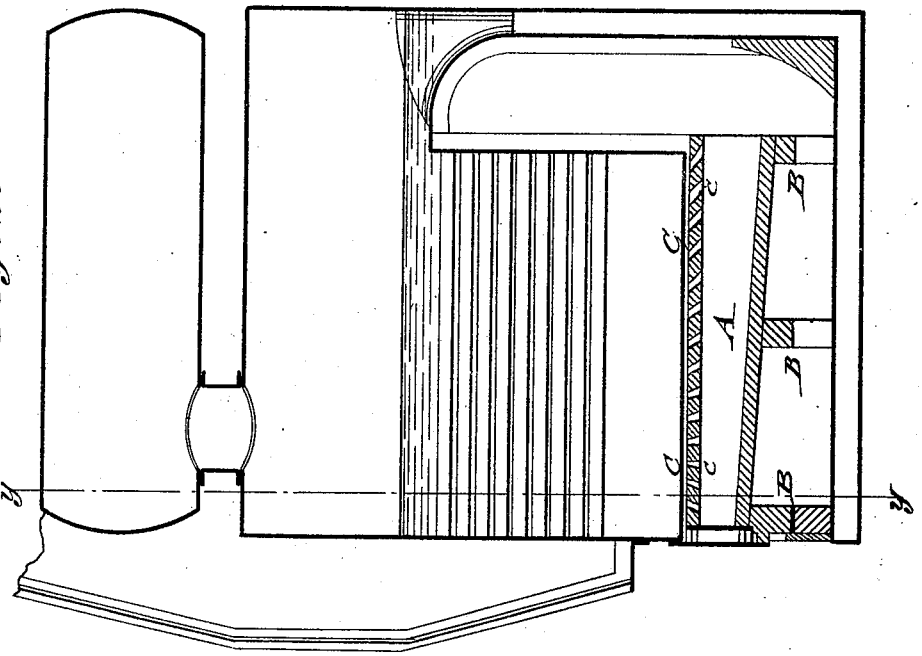
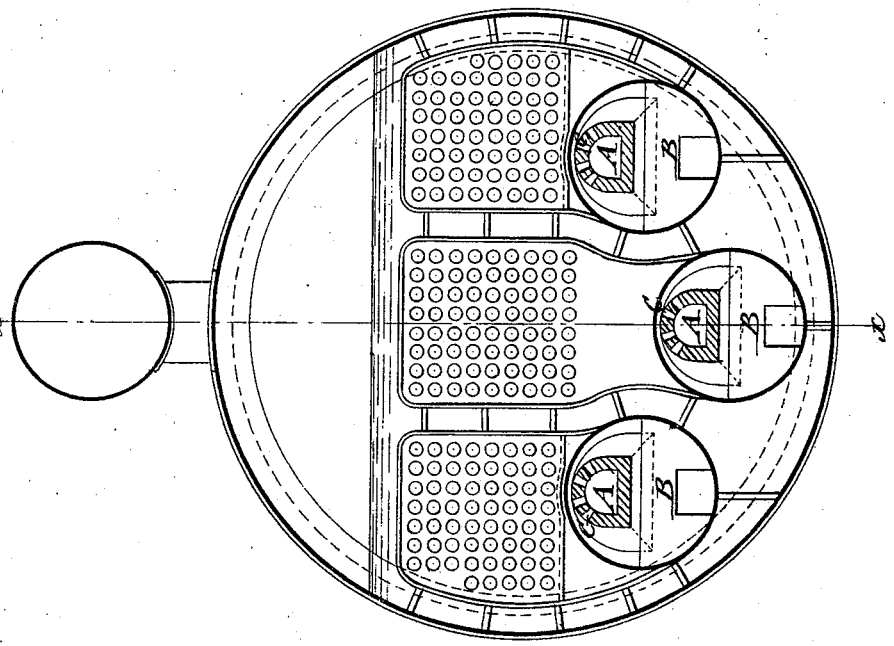


Fig. 1.



WITNESSES:

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UNITED STATES PATENT OFFICE.

GEORGE K. STEVENSON, OF VALPARAISO, CHILI.

IMPROVEMENT IN RETORT-FURNACES FOR STEAM-BOILERS.

Specification forming part of Letters Patent No. **185,052**, dated December 5, 1876; application filed September 30, 1876.

To all whom it may concern:

Be it known that I, GEORGE K. STEVENSON, of Valparaiso, in the Republic of Chili, have invented a new and Improved Furnace for Burning Powdered Charcoal, of which the following is a specification:

The object of this invention is to adapt the furnace of steam-boilers of all kinds for the purpose of burning coal-dust or other powdered fuel, and insuring a perfect combustion of the same.

The coal-dust or other fuel is introduced to the furnace by any suitable means that secures an even supply of fuel mixed with air, for the thorough combustion in the furnace.

The invention consists of a furnace made of the shape of a retort, of fire-brick, open at both ends, and provided with radial or inclined discharge-channels at the upper parts.

In the accompanying drawing, Figure 1 represents a vertical transverse section, on line *x x* of Fig. 2, of a marine boiler provided with my improved furnace for burning powdered fuel; and Fig. 2 is a vertical longitudinal section of the same on line *x x*, Fig. 1.

Similar letters of reference indicate corresponding parts.

Referring to the drawing, A represents my improved furnace, which is made in the shape of a retort, of fire-brick, and preferably tapering from the wider rear end to the smaller front end, through which the mixed coal-dust and air are introduced for combustion.

The furnace is open at both ends, and either made with equal or different areas at the two ends, which areas may be decreased by placing fire-brick into the entrance or outlet ends.

For starting the fire it is expedient to place a few fire-bricks into the inner or outlet opening, which bricks will be gradually worn away by the intense heat of the fire, so as not to require special renewing.

The retort-furnace may be used in connection with any boiler by removing the furnace-front, grate-bars, and cross-bearings. Three or four cross-walls, B, are then built to support the bottom of furnace A, an opening being left through each of the supports for removing the ashes by a parallel-sided scoop.

The fire-brick furnace A is extended back far enough to reach the uptake of the return-tube boilers, or in single-flue boilers—say, from eight to ten feet. This length insures the combustion before the fuel leaves the retort, so that the flame or ignited gases give the extra effect desired to be produced.

The top or circular part of the retort is perforated with openings C, radial or inclined, through which the heat of the retort is allowed to escape and play on the crown of the furnace.

When the retort or furnace is placed in position on the supporting-walls the furnace-front is again replaced. The retort is then partly charged with a quantity of wood and coal, and lighted. The apparatus by which the powdered fuel is introduced is then placed in position and the fuel fed to the furnace, after the coarse fuel is thoroughly ignited by the blast from a blower used in connection therewith. The powdered fuel is then continually introduced, care being taken to remove the ashes from beyond the mouth or inner end of the retort, which can be done in a few minutes.

The apparatus may be detached and replaced, and the operation proceeded with, without a great decrease of temperature, as the fire-brick retort retains some of the heat from previous firing. The fuel is completely consumed by the addition of air injected with the same into the retort, and thereby a high and uniform degree of temperature be kept up, while the fire may be instantly interrupted without the loss of large quantities of fuel, and also be started again with great rapidity, so as to facilitate the getting up of steam in boilers.

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

A furnace provided with the retort A, supported on walls B, extended to the uptake of return-tube, and having inclined top perforations C, as and for the purpose specified.

GEORGE K. STEVENSON.

Witnesses:

PAUL GOEPEL,

C. SEDGWICK.