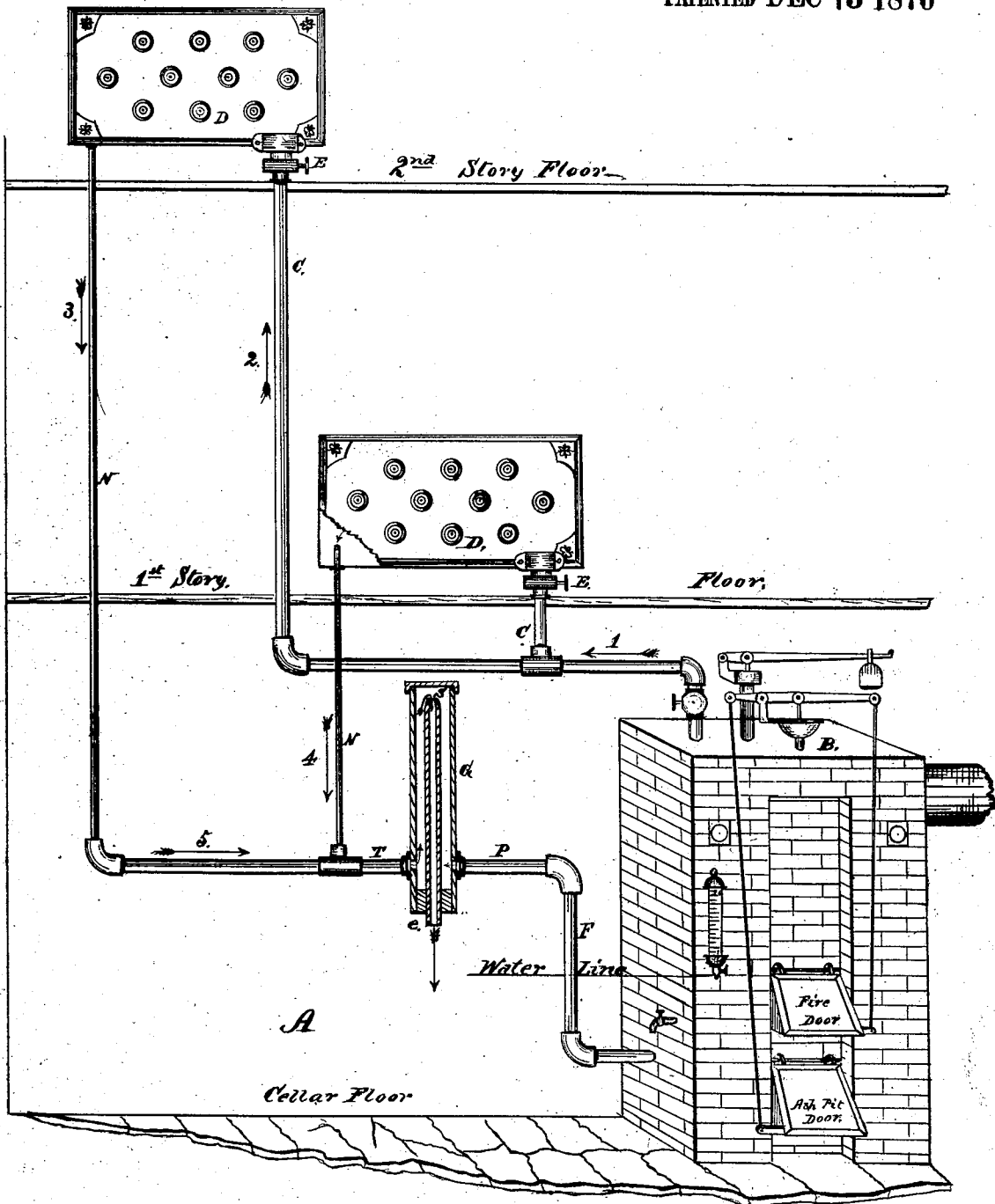


*Edward Bourne's*

*Low Pressure Steam Apparatus for  
Warming Buildings.*

110003

PATENTED DEC 13 1870



*-Witnesses-*  
*Geo. Stewart*  
*Alma Price*

*-Inventor:-*  
*Edward Bourne,*  
*per his Attorney,*  
*Josiah W. Ellis*

# United States Patent Office.

EDWARD BOURNE, OF PITTSBURG, PENNSYLVANIA.

Letters Patent No. 110,003, dated December 13, 1870.

## IMPROVEMENT IN STEAM-HEATERS.

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

I, EDWARD BOURNE, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain Improvements in Low-pressure Steam Apparatus for Warming Buildings, of which the following is a specification.

### *Nature and Objects of the Invention.*

The nature of my invention consists in such a construction, combination, and arrangement of parts constituting this apparatus as that the opening and closing of the air-vents of the radiators will be done automatically, that is, by the rising and falling of a hydrostatic column, actuated by the fluctuating or varying pressure of steam in the generator.

### *Description of the Accompanying Drawing.*

The accompanying drawing illustrates my improved low-pressure steam apparatus for warming buildings, and which is represented partly in perspective and partly in section.

### *General Description.*

In the cellar A, or some other convenient locality, is placed a simply-constructed steam-generator, B, mounted within a substantial inclosure of brick, so as to insure the least danger from fire and the greatest economy of fuel.

From this generator the steam is conducted through metallic pipes, C, to the radiators D, which may be located in the various rooms of the building where heat is desirable.

This steam-generator, with its draught-regulating and other appendages, is similar in most respects to those already in use; therefore its construction, and operation in the generation of steam, together with its attachments and connection with the radiators D, and their construction, being so well known no particular description of them is herein deemed necessary.

In all apparatus of this character the air in the radiators must be expelled on the approach of steam, otherwise the confined air will hold the steam in check and prevent its entering, and its much-desired heat from becoming available, the radiators remaining inoperative and cold.

The only plan heretofore in use to get rid of this air has been to provide each radiator with an "air-key" or vent, to be opened by hand on the approach of steam, so that the air might be allowed to pass out, and closed by the same means when the steam began to escape, involving a great deal of time, trouble, and uncertainty.

To obviate this, and accomplish the object of my invention, I construct the steam-generator B, radi-

ators D, connecting-pipes C, and induction-valves E, in any of the well-known ways, but attach to the generator a pipe, F, which communicates with its interior a safe distance below the water-line.

This pipe extends to the outside of the brick-work inclosing the generator, and is then carried vertically above said water-line a distance of twenty-six inches; then, by a horizontal branch, P, is made to open into and near the bottom of an upright tube, G.

Extending through the bottom of this tube, and standing vertically therein, is a small pipe, e, reaching to very near the top of its rising-tube G. This small pipe is open at both ends, the lower end being in communication with the atmosphere, and the upper end s with the interior of its surrounding tube G.

On a line with the horizontal branch-pipe P, and attached to and opening into the tube G in the same manner, is another longer pipe, T, which communicates with the radiators D; each by means of a small upright pipe, N.

### *Operation.*

The several parts being constructed and arranged as shown and set forth, and the generator B supplied with water till it stands at the proper level, and fuel in the furnace ignited, steam will be generated and pass into and through the pipe C in the direction indicated by arrows 1 and 2, when, on opening the valves E, it will enter the radiators D, driving the air before it down through the small escape-pipes N, shown by the arrows 3, 4, and 5, and onward through the large horizontal pipe T into the upright tube G, in which it will ascend and escape downward through the inclosed vertical pipe e.

Before steam is generated the water in the pipe F and boiler will be on a level; but when more steam is produced than is required to fill the proper space and radiators open to receive it, a pressure is created upon the surface of the water in the boiler, and when the steam accumulates to the pressure of one pound to the square inch the water in the pipe F will rise twenty-six inches above the level of the water in the boiler, according to a well-known law of nature.

This water as it rises will pass through the horizontal branch pipe P into the tube G, and as it rises in this tube soon has the effect of closing the mouth of the pipe T, thus, with a water-seal, stopping the air-vent of the radiators in a most complete manner; and this operation will be repeated as long or as often as the steam in the generator falls below or rises above a certain degree of pressure, being self-regulating or automatic in its character.

*Claim.*

I claim—  
Such a construction, combination, and arrangement of parts constituting a low-pressure steam apparatus for warming buildings as that the opening and closing of the air-vents of the radiators will be done automatically, that is, by the rising and falling

of a hydrostatic column, actuated by the fluctuating or varying pressure of steam in the generator.

EDWARD BOURNE.

Witnesses:

JOSIAH W. ELLS,  
ANDREW HUMBERT.