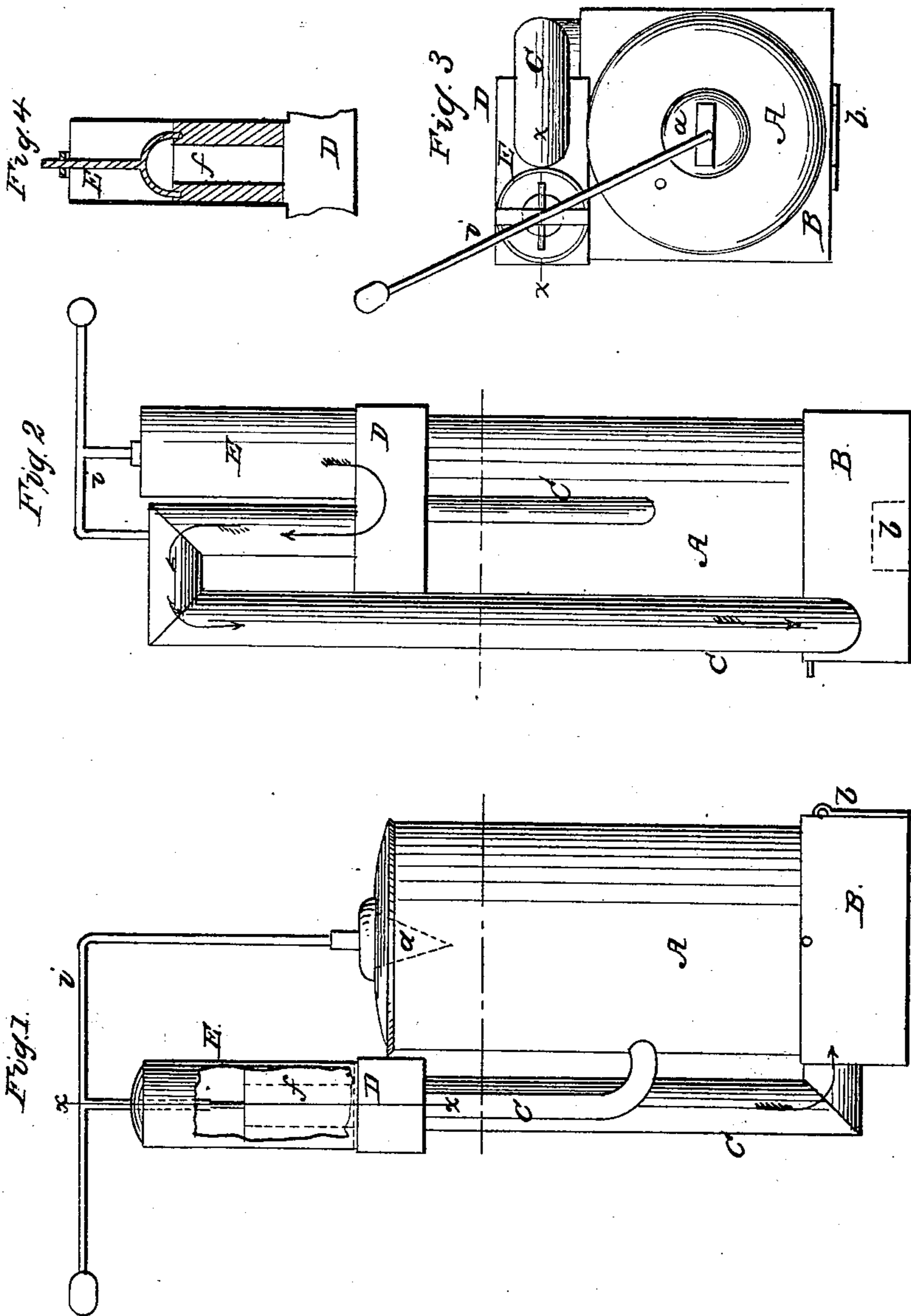


## Steam Heater.

No. 14,158.

Patented Jan. 29, 1856.



# UNITED STATES PATENT OFFICE.

STEPHEN J. GOLD, OF NEW HAVEN, CONNECTICUT.

## APPARATUS FOR HEATING BUILDINGS BY STEAM.

Specification of Letters Patent No. 14,158, dated January 29, 1856.

*To all whom it may concern:*

Be it known that I, STEPHEN J. GOLD, of the city and county of New Haven and State of Connecticut, have invented a new and useful Improvement in Apparatus for Warming Buildings by Steam; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, forming part of this specification, in which—

Figure 1 is an elevation of furnace showing end of box forming communication of between float chamber and draft pipe; float chamber being broken to show float. Fig. 2 is an elevation, showing side of box. Fig. 3 is a top view showing connection between float and conical valve. Fig. 4 is a vertical section of float chamber and box, on line *x x* of Fig. 3.

Similar letters of reference in the several figures denote the same part.

The invention here considered is designed to be used in connection with the apparatus for warming buildings by steam, patented by me October 3d, 1854. It refers to the regulation of the furnace draft, and to the automatic cooling of the boiler when the entire amount of steam that may be generated, is not required for warming purposes. The first of these functions is performed by a flow of water from the boiler, into the draft passage, so as to diminish its capacity, or close it entirely as circumstances require: thus constituting what I term the hydraulic seal. This rise of water is caused by pressure of steam in the boiler, under circumstances which will be fully set forth. The second function is effected by the lifting of a valve above the furnace, by the rise of water above the point where the hydraulic seal is applied, when after the draft is cut off there is still an excess of steam above that required for the radiators: this lifting of the valve being produced by its connection with a float which rises as the water from the boiler flows into a chamber provided therefor.

The details of the construction and operation of my improvement will be readily understood from the following description and reference to the annexed drawing, where the several parts are thus represented. A:—boiler and furnace of construction shown in patent of Oct. 4d, 1854: a cylindrical opening passing from the furnace through

the boiler, covered at top by a conical valve *a*, shown in dotted lines in Fig. 1. B:—ash chamber, closed by door *b* shown in dotted lines in Fig. 2. Besides this door the ash chamber has a communication with the external air by pipe C, sealing box D, and float chamber E, as shown by arrows in Figs. 1 and 2. These several pipes and chambers constitute the draft passage of the furnace. C:—draft pipe, opening at bottom into ash chamber below grate, and after curving upward as in Fig. 2, opening into sealing box D. D:—sealing box, opening at top into pipe C and float chamber E, and communicating at bottom with the boiler by pipe C, issuing from the boiler about midway between its bottom and high water mark, shown by red line in drawing. E:—float chamber, opening into box D, and open to the air at top. It contains a hollow float *f* as shown in Fig. 4. The lower mouth of this chamber should be fourteen inches above high water mark in the boiler. This being the sealing point there will be no action to effect the furnace until the steam is of the required pressure, which is about one half pound to the square inch. *f*:—float, connected with the valve *a*, by rod *i*, so that the rise of the float will elevate the said valve. This connection may be varied in many ways to conform to the locality of the apparatus; the only point to be considered being that the valve shall be lifted as the float rises. The position of the float chamber being such that the water cannot enter it until the hydraulic seal shall have been placed upon the draft.

The operation of the invention is as follows: The draft passes as indicated by arrows, aiding combustion in the usual way and effecting the generation of steam, which passes to the apartment to be warmed as described in my former patent above mentioned. So long as the supply of steam is no greater than is demanded by the radiators, the draft remains unimpeded. But when from the temperature of the external air, the condensation in the radiators is slow, or but a portion of the radiators is brought into action (as shown in former patent), there will be an increased pressure of steam on the surface of the water in the boiler causing it to rise through pipe C into box D. This rise of water in the box gradually diminishes the draft passage, until by the continued rise the mouth of chamber E is

reached and the hydraulic seal is established, entirely shutting off the draft. This of course deadens the fire, but should the pressure still continue, the water will pass into  
 5 chamber E and lift float *f*, thereby raising the conical valve *a*, and permitting the entrance of cold air into the boiler flue. Cold air let in at the opening takes the place of  
 10 the heated air there existing when the flue is closed, and causes the steam instantly to condense. This removes the pressure and permits the water to return to the boiler, letting down valve *a*, and gradually removing the hydraulic seal; when the draft is  
 15 reinstated and all proceeds as before.

It should be stated in this connection that the draft passes through the opening in float *f*. This construction may be varied  
 20 however, by making the float chamber separate and connected by a pipe with the sealing box D. The float chamber E in this case becomes a branch of the draft pipe. The action of this float may sometimes be  
 25 produced by the opening of a door *b* by accident or otherwise. In this case the flow of cold air to the boiler speedily prevents any ill effects from the undue draft of the furnace. A bell is so connected with this float  
 30 as to give notice that the ash chamber door is open. The cooling of the boiler closes the valve, but it soon rises again and gives notice by the ringing of the bell that the door is open, and continues to rise and fall until the door is closed. The float may if neces-  
 35 sary be so connected with the door as to close it if it be left open. These two hydraulic regulators render the action of the

apparatus altogether automatic; the fire adjusting itself to the demand for steam in the radiators; and as this demand depends  
 40 on the rapidity of condensation, which is governed by the temperature of the atmosphere, the fire may be said to regulate itself to the temperature of the air to be warmed. In this respect the apparatus differs widely  
 45 from the other automatic regulators in use, since there are none but what require adjustments of some part to suit the temperature of the external air. This excellence is  
 50 of the first importance in apparatus of this nature, simplifying their construction and rendering them easier to manage.

I claim as new and of my own invention and desire to secure by Letters Patent—

1. The automatic governing of the draft  
 55 and the shutting off of the same by the forcing of water from the boiler by pressure of steam, under the circumstances, and substantially as specified, or in other words establishing the hydraulic seal. 60

2. I also claim the automatic government of the valve *a*, by the forcing of water from the boiler by pressure of steam, under the circumstances, and substantially as set forth. The governing of draft valves by expansion of water being expressly disclaimed, as  
 65 constituting no part of my invention.

In testimony whereof, I have hereunto signed my name before two subscribing witnesses.

STEPHEN J. GOLD.

Witnesses:

GEO. PATTEN,  
 JAS. D. CLARY.