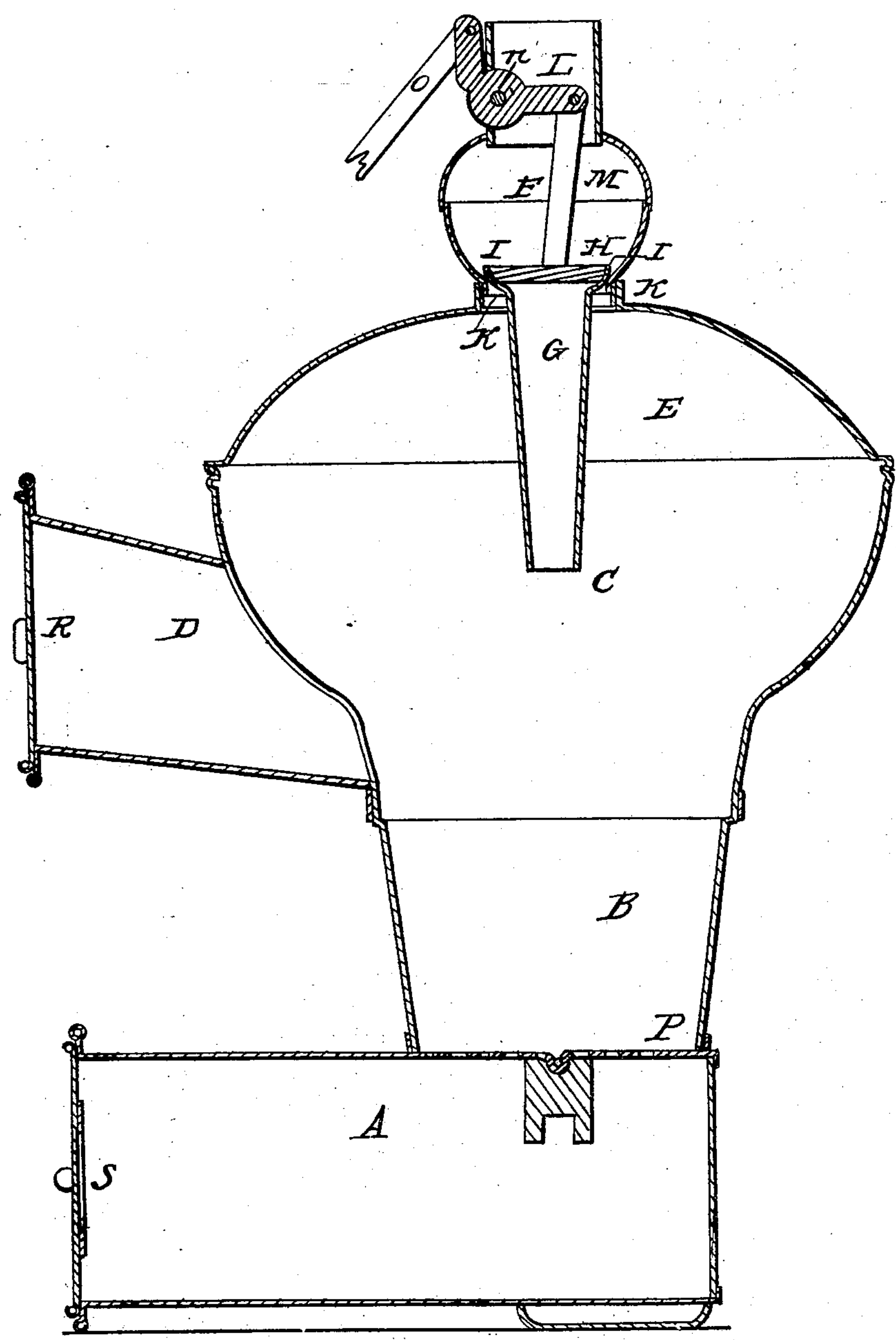


G. S. G. SPENCE.
Hot Air Furnace.

No. 13,015.

Patented June 5, 1855.



UNITED STATES PATENT OFFICE.

GEORGE S. G. SPENCE, OF BOSTON, MASSACHUSETTS.

FURNACE FOR WARMING BUILDINGS.

Specification of Letters Patent No. 13,015, dated June 5, 1855.

To all whom it may concern:

Be it known that I, GEORGE S. G. SPENCE, of Boston, in the county of Suffolk and State of Massachusetts, have invented a new and useful Improvement in Air-Heating Furnaces for Warming Buildings; and I do hereby declare that the same is fully described and represented in the following specification and the accompanying drawing, which exhibits a longitudinal, central, and vertical section of the ash-pit, fireplace, smoke-chamber, fuel-entrance, and discharge-pipe of a furnace of such description.

In the said drawing, A, is the ash-pit or box; P, the grate; B, the fire-pot or place; C, the smoke chamber over the same; D, the fuel throat of said smoke chamber; E, the reverberating dome of the smoke chamber; F, a discharge pipe extending above said reverberating dome; R, and S, are doors of the ash pit and fuel throat.

From the upper part or middle of the dome and directly over the fire place, I extend a pipe G, downward within the dome and smoke chamber and toward the fire place as seen in the drawing, said pipe being open at its lower and upper ends so as to enable smoke to pass from the chamber C, into the lower end, and from thence through the said pipe and into the main discharge pipe F. The upper part of the pipe G, surrounded by the discharge pipe F, is affixed to an annular valve H, which, when resting upon its seat I, I, closes the opening K, K, or passage from the smoke chamber into the main discharge pipe. The valve, H, is suspended to a bent lever, L, by means of a connecting link or rod, M, arranged as seen in the drawing, such lever turning upon a fulcrum at N, and having a working rod or bar, O, jointed to it. By pulling upon the working rod, the valve and the pipe G, will be simultaneously elevated the former being raised off its seat. By attaching the pipe G, directly to the valve, we avoid the necessity of employing arms or such like devices to support the pipe from the dome, such being not only objectionable on account of their obstructing the smoke passage, K, K, but by reason of their liability to collect soot and thus further diminishing the passage.

In the operation of a furnace so made, the smoke and gases proceeding from the

fire will rise into the smoke chamber and against its dome within and by which they will be more or less retained and consumed, their heat being absorbed by such dome and by it radiated into the surrounding air. The balance of the volatile combustible products or those unburned will be reverberated or deflected downward toward the fireplace and will pass in convergent streams toward the mouth or lower end of the pipe G, and flow up said pipe into the discharge pipe, F. When the fire is first kindled or whenever otherwise necessary, the valve, H, may be elevated off its seat so as to cause the smoke and gases within its dome to escape through the opening K, K, without being made to pass downward toward the lower end of the pipe, G, and into and upward through said pipe as before described.

The effect of my arrangement of the tube G, within the dome and smoke chamber is not only to confine the smoke and gases immediately over the fire place where they can be burned to advantage but to cause them to descend toward the fuel in convergent streams, whereby they are intensely heated and more likely to be thoroughly consumed than they would be were they suffered to flow from the top of the dome in radial divergent streams leading them away from the fire place.

This arrangement has the advantage of economy and simplicity of structure and is peculiarly adapted to the combustion of bituminous coal which cannot be used conveniently in those furnaces in which the main smoke discharge pipe is connected with the smoke chamber by sundry small pipes leading out of the sides of such chamber and into an annular radiator, which is made to open into such main pipe.

I do not claim combining the dome of the smoke chamber of an air heating furnace with one or more pipes so leading from the said dome or from the said smoke chamber that the smoke and gases in passing against such dome shall be deflected in streams divergent from or with respect to the fireplace, nor do I claim arranging an exit tube within the middle of a reverberatory chamber, and surrounding such tube by another tube or chamber which will prevent the volatile products of combustion when descending toward the fuel from coming

into contact with the flame thereof before they pass into the receiving end of the tube; but

What I do claim is—

- 5 1. So arranging and combining the exit tube, G, within the reverberating dome and smoke chamber and with respect to the fire place thereof as specified, that the smoke and gases reverberated from the dome may
10 not only pass toward the exit tube in convergent streams, but be deflected toward and against the fuel or flame thereof, before they may escape into the lower end or mouth of the tube, my improvement being
15 productive of a more perfect combination of the said volatile products, that takes place when the exit tube is surrounded by another tube or case, which separates the

descending gaseous currents from the fire before the escape into such tube. 20

2. I claim so combining the valve H, and the discharge tube, G, that the tube may be movable with the valve and pass through the valve opening as described the valve thus serving to support the tube and rendering unnecessary any arms or such like devices which would tend to collect soot and otherwise obstruct the draft through the valve opening. 25

In testimony whereof, I have hereunto set my signature this twelfth day of February A. D. 1855. 30

GEORGE S. G. SPENCE.

Witnesses:

R. H. EDDY,

F. P. HALE, Jr.