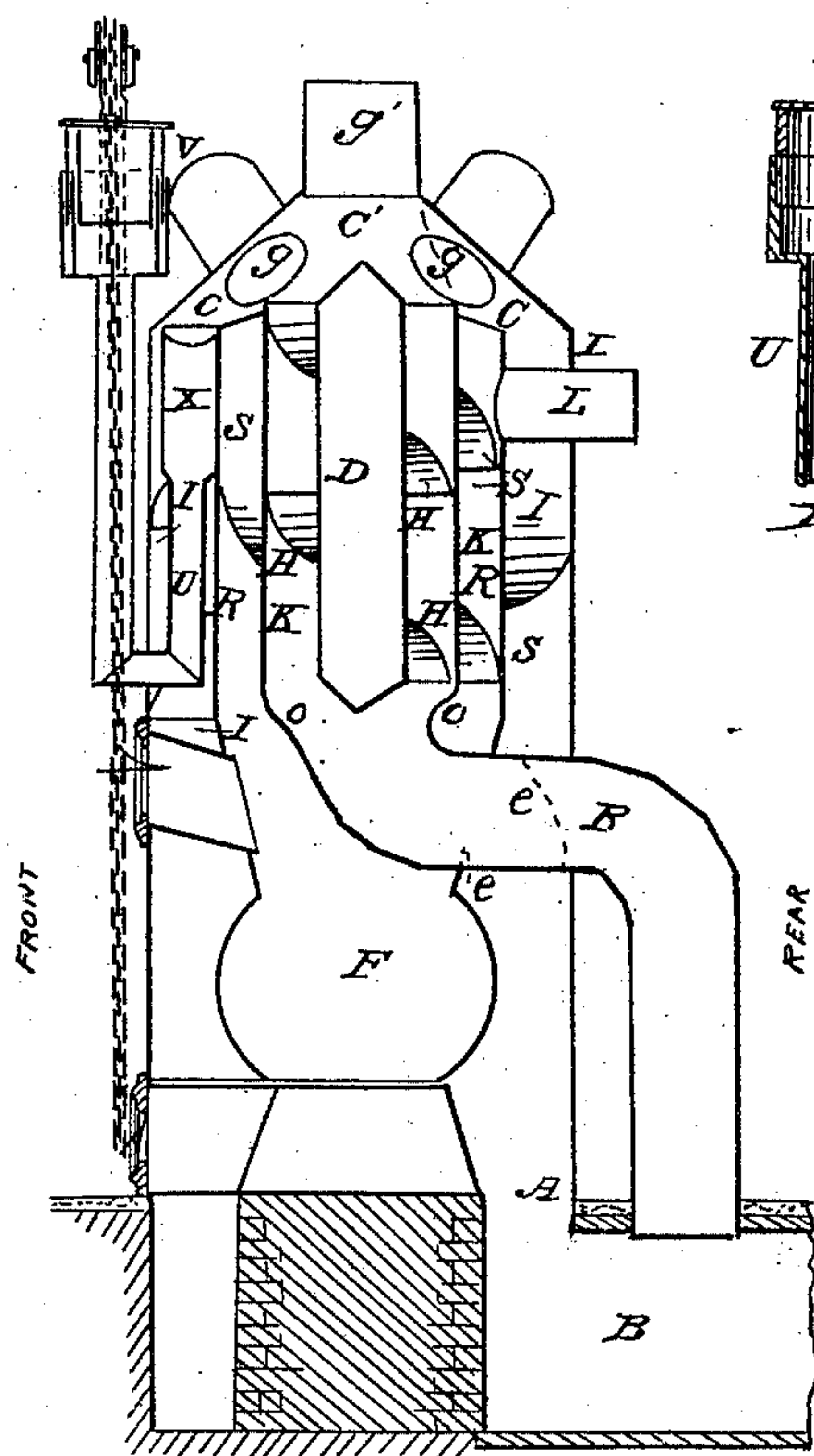


S. MEAD.  
Hot Air Furnace.

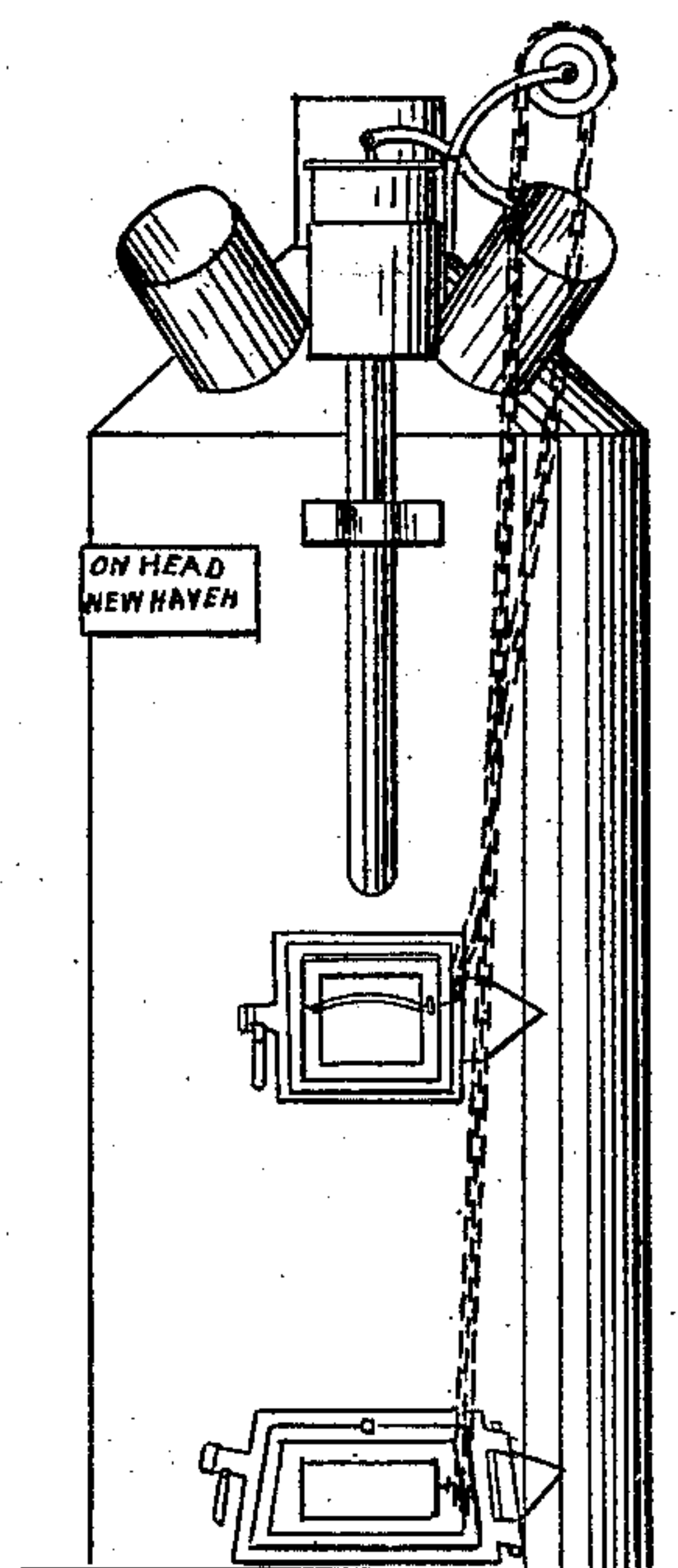
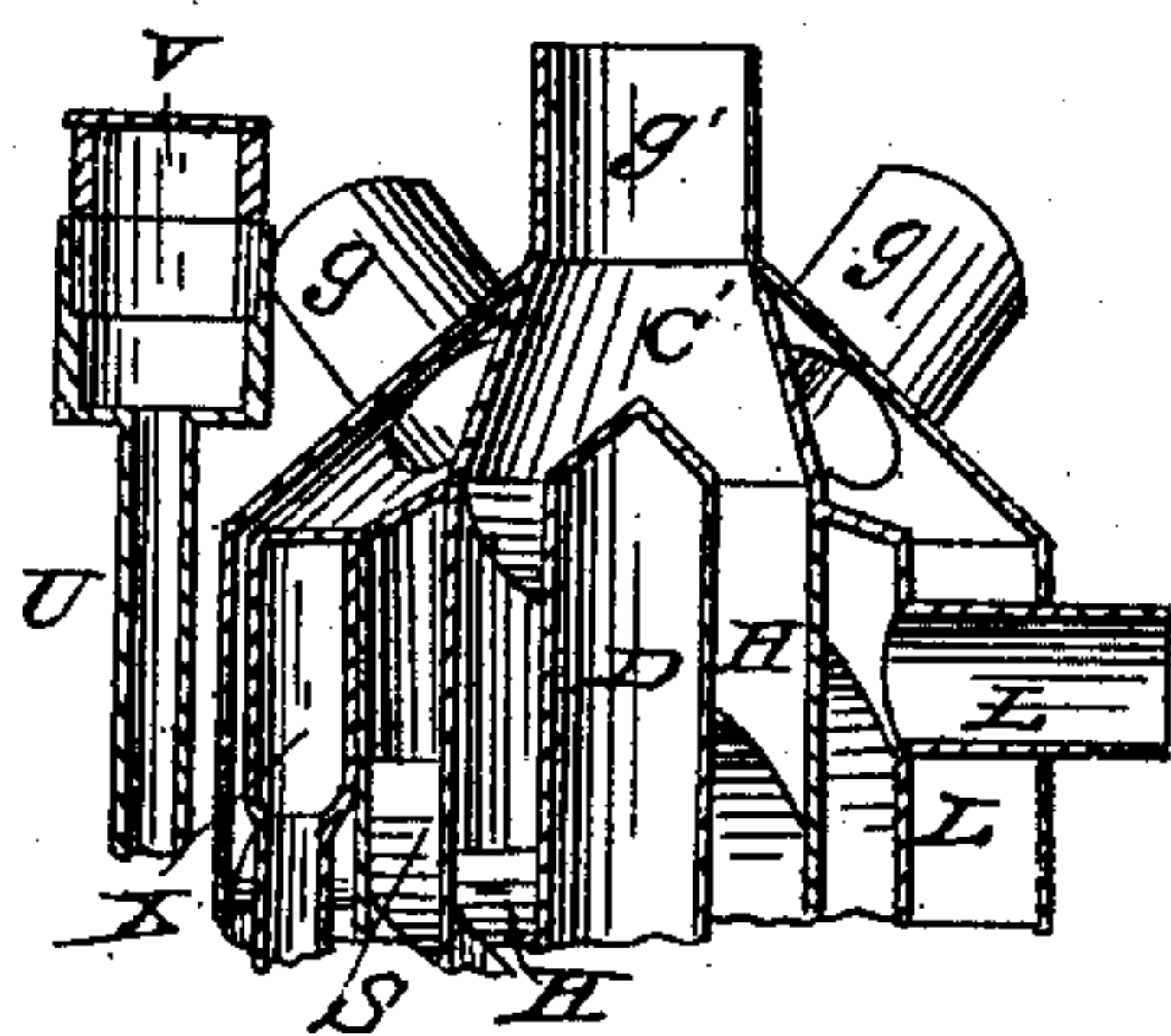
No. 34,003.

Patented Dec. 24, 1861.

*Fig. 3,*



LONGITUDINAL SECTION  
From FRONT TO REAR



FRONT ELEVATION.

INVENTOR:  
*Solomon Mead*

# UNITED STATES PATENT OFFICE.

SOLOMON MEAD, OF NEW HAVEN, CONNECTICUT.

## IMPROVEMENT IN HOT-AIR FURNACES.

Specification forming part of Letters Patent No. 34,003, dated December 24, 1861.

*To all whom it may concern:*

Be it known that I, SOLOMON MEAD, of New Haven, in the county of New Haven and State of Connecticut, have invented new and useful Improvements in the Construction of Hot-Air Furnaces; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, in which—

Figure 1 is a front elevation of my improved furnace. Fig. 2 is a vertical longitudinal section of the same. Fig. 3 is an axial section of the upper part, exhibiting more accurately the structure and arrangement of the hot-air pipes hereinafter described.

The nature of my invention consists in an improved arrangement of pipes and flues for advantageously heating and distributing the air, as hereinafter explained.

That others skilled in the art may be able to make and use my invention, I will proceed to describe its construction and operation.

A is the main air-passage leading from the cold-air chest B through spiral passages I to the upper part C, whence the air is conveyed by pipes *g g* to the apartments which it is desired to warm.

F is the fire-pot. The products of combustion rise through an annular spiral flue S to a pipe L, by which they are discharged into the chimney.

P is a pipe conveying air from the chest B to the space within the flue S, where it is highly heated and conveyed upward through spiral passages H to the crown C', from whence the air is conveyed by a pipe *g'* to any room or rooms where a greater degree of heat is required than that furnished through the pipes *g*.

D is a drum placed concentrically within the passage H to increase the area and cause the air to pass in closer contact with the heating-surface K.

X is an air-chamber connected with an inverted siphon U to contain water or other fluid which operates through a float V or other apparatus to control the draft. The expansion or contraction of the air within the chamber X raises or lowers the float V, which, acting upon the draft-doors through suitable chains or rods, secures a regular and uniform temperature, and by an adjusting device may

be made to keep the furnace-heat at any degree desired.

The air-pipe P may have its connection externally and directly with the cold-air box B, as shown in the drawings, or it may receive its supply through the air-passage A, as shown by the dotted lines *e*.

The enlargement of the pipe P, as shown by the lines *o*, admits of the introduction of a drum D, around which the internal heating-air is caused to pass by means of spiral flues H in more complete contact with the radiating-surface K.

Some very obvious advantages gained by this internal heating arrangement may be named. The greatly-increased radiating-surface which this arrangement adds gives a like increase of power and efficacy to the furnace and constitutes a saving of the entire heating ability of the internal radiating-surface K. The internal air-passages P H C', being completely surrounded by the fire-flue S, may connect with a hot-air pipe leading to any apartment which it may otherwise be difficult to heat, and thus the internal power of the furnace be used in any given direction independent of any connection from the general hot-air chamber C. The use of the spiral flues for conducting the heat and smoke will at once be obvious, as they serve not only to retain a longer action of the heat by causing it to pass around between the radiating-surfaces, but also serve to interrupt in a measure so rapid a passage of the heat from the fire to the smoke-pipe, and thus enables the gases to impart to the radiating-surfaces a larger portion of their heat. The use of the spiral flues for the circulation of the heating-air in the furnace will also be obvious, as thereby the length of the heating-circulation is materially increased and all the air is caused to pass within a few inches from the radiating-surface over its entire length, and receives in its spiral passage a rolling motion which brings every part in contact with the radiating-surface, thus avoiding the necessity of raising the temperature of the radiating-surfaces to so high a degree as to be objectionable in effect on the quality of the heated air, yet securing a sufficient and desired amount of heat.

The obvious utility and value of the self-



regulating arrangement for governing the draft will readily be seen in the explanation. The air-chamber X is placed within the furnace in connection with an inverted siphon or bent tube U, one part of which may be brought without the furnace and connect with a float-box or other apparatus for working the draft-doors. The operation of this draft arrangement is effected by the heat of the furnace, which expands the air in the air-chamber X, and thereby displaces a part of the water in the siphon and elevates it in the float-box, and thus serves as a motive power to open and close the draft-doors, each door working in opposite direction at the same time—that is, while one is closing the other is opening, and vice versa.

The particular advantages to be derived from the above-described method of regulating the draft are, first, a large saving in the consumption of fuel; second, a regular and uniform temperature of heat from the furnace, with a ready change of the same to any

desired degree; third, a great saving in time and attention to the furnace.

I am aware that spiral flues have long been in use, both for air and for the products of combustion. I am also aware that self-regulating thermal devices have long been applied to heating apparatus of various descriptions. I do not therefore desire to be understood as claiming either of these as my invention; but,

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

The combination of the external spiral air-passage A I C, internal spiral air-passage P H C', spiral fire-flues S, and separate conducting-pipes *g* and *g'*, all arranged in the manner and for the purposes herein shown and explained.

SOLOMON MEAD.

Witnesses:

H. M. WELCH,

E. I. SANFORD.