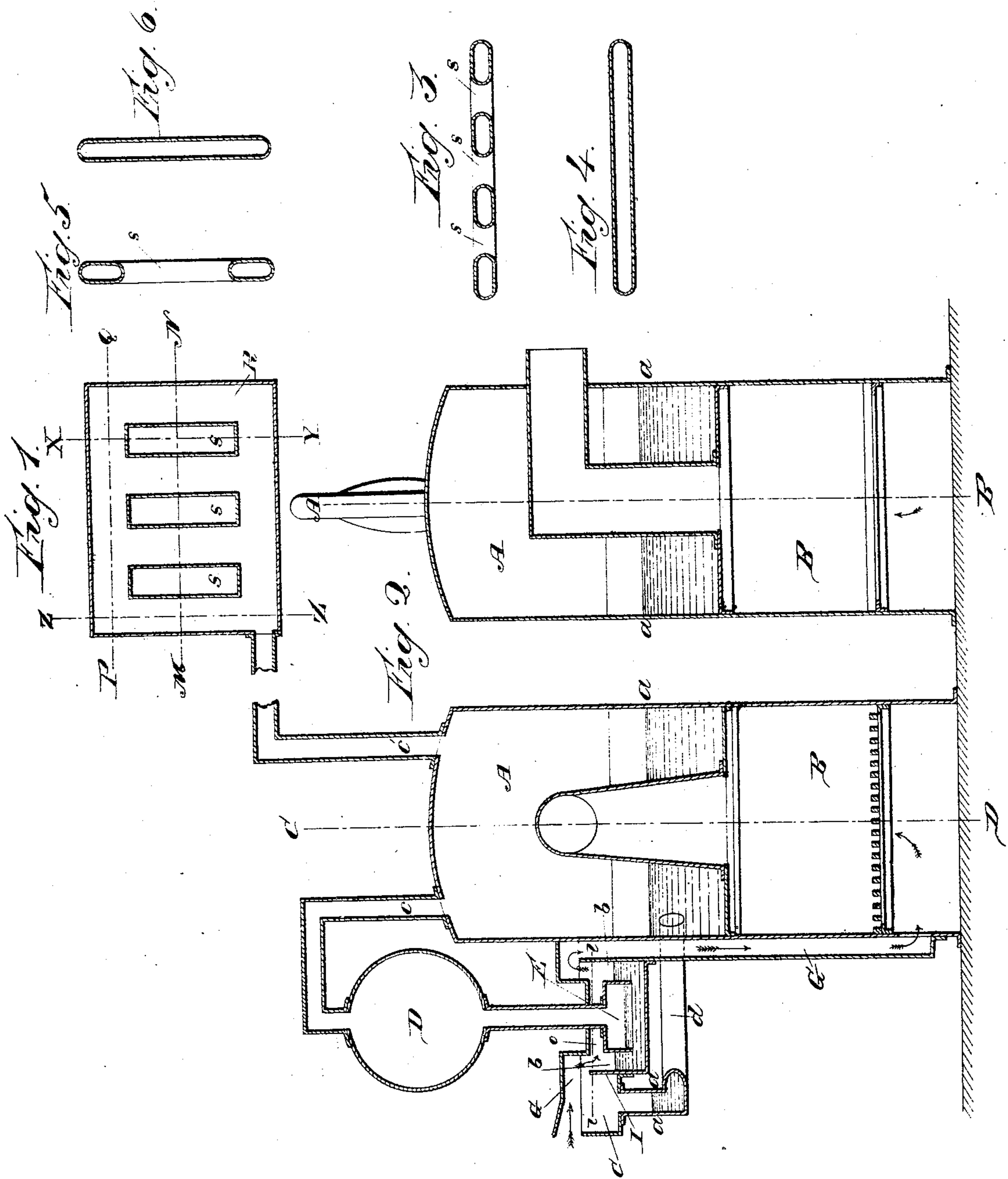


P. E. CHASE.
Heating Apparatus.

No. 13,842.

Patented Nov. 27, 1855.



UNITED STATES PATENT OFFICE.

PLINY E. CHASE, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN STEAM-HEATING APPARATUS.

Specification forming part of Letters Patent No. 13,842, dated November 27, 1855.

To all whom it may concern:

Be it known that I, PLINY E. CHASE, of the city and county of Philadelphia, and State of Pennsylvania, have invented certain new and useful Improvements in Warming Buildings; and I hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making part of this specification, in which—

Figures 1 and 2 represent vertical sections through the axis of the apparatus, which is composed of the following parts:

First, the fire-chamber B is a close space similar to that of an air-tight stove, of any convenient shape, having a grate suitable for the peculiar fuel to be used, an ash-pit, a chimney or flue-pipe for the purpose of carrying off the products of combustion, and an air-supply pipe, G, abutting in the ash-pit chamber below the grate; second, the boiler A is set above the fire-chamber, the chimney-flue of which penetrates into the interior of the boiler, conveying through it the heated gases and smoke, diffusing most of its available heat. At the top or at any part of the boiler above the intended level of the water is attached, third, the steam-pipe C, in connection with the globe D, and the expansion steam-bell E, the latter plunged into, fourth, the regulating-tank O. To complete the description of the parts, I have to mention, fifth, the water-feed pipe *d*, leading from the collecting-tank C to the boiler A, and, sixth, the radiator R. The whole apparatus is inclosed in a suitable chamber for heating the air which is conveyed into the apartments to be warmed.

To convey a clear and distinct conception of the apparatus, I add the following description of its *modus operandi*:

The apparatus being set in working order—that is, the water in the boiler being raised to a temperature making steam by the effect of the heat from the fire-chamber—the steam in the boiler will expand, gradually increasing its pressure upon the water in the steam-bell E and causing the water of the regulating-tank O, surrounding the bell, to rise to a level the height of which is proportional to the pressure inside the bell. When the tension of the steam is such as to raise the level of the water to the dotted line *i i*, the supply of air

to the fire-chamber is intercepted and the fire is consequently slackened. Should the pressure of the steam be still increasing, the water of the regulating-tank O is forced to run over the partition I into the pipe *d*, and there it is mixed with the water contained in the boiler, reducing the temperature of the latter. There is another supply of water to the boiler arising from the condensation of steam in the pipe c and the globe D. This peculiar mode of circulation of water and condensed steam obviates greatly the necessity of frequently replenishing the boilers. If the head of steam becomes too powerful, notwithstanding the check of draft by the elevation of the water-level in the regulating-tank and the lowering of temperature, the water in the bell will be pressed below the level of its edges. The steam will escape from E into the flue G, which will check the combustion of the fuel. By the sudden cooling of the fire-chamber a vacuum is produced by the condensation of steam in the boiler, which would draw the water back from the regulating-tank through the steam-pipes and cause disturbance and irregularity in the operation of the apparatus. This is prevented by the globe D, which has a capacity as large as that of the tank itself.

By the above-described apparatus the warming process is conducted in the best conditions as to economy of fuel, perfect ventilation, and constant supply of warm fresh air charged with a certain quantity of moisture, highly beneficial to health.

The air is admitted at an opening managed at the lowest section of the heating-chamber and surrounding the apparatus. It is heated in its gradual ascension, first, by contact with the fire-chamber; secondly, by hot water from the boiler; then by steam from the different steam-pipes and radiators, it being thus heated in three different modes, exhausting all available heat diffused by conduction, convection, and radiation, the chamber being, moreover, filled with steamy atmosphere from the incessant evaporation of water from the tanks, which will effectually charge with moisture the air which is conveyed to the rooms.

The apparatus is self-regulating, as the draft to the fire-chamber is controlled by the pressure of steam upon a column of water,

and in consequence of the same arrangement it is self-controlling, dispensing with safety-valves and removing all danger from explosion. The temperature of the air itself is also regulated by the operation of the apparatus.

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

The peculiar arrangement of the pipes *c* and

d, the draft-pipe *G*, and the tanks *O* and *C*, in combination with the steam-chamber *E*, in the manner described, and for the purposes specified.

PLINY E. CHASE.

Witnesses:

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