(No Model.)

A. CLAYPOOL.

GAS OR VAPOR HEATING APPARATUS.

No. 366,569. Patented July 12, 1887.

Fig. 2.

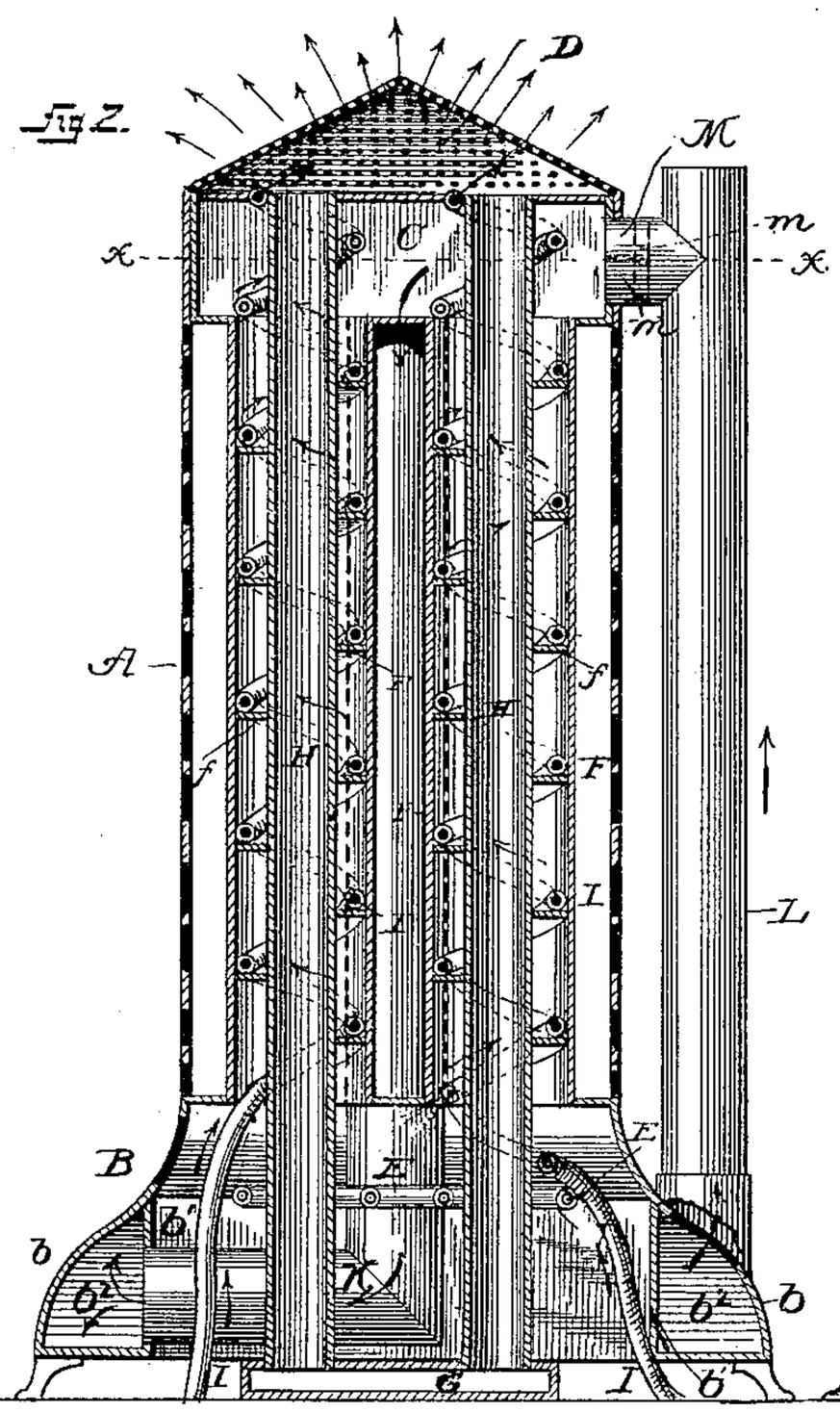


Fig. 1.

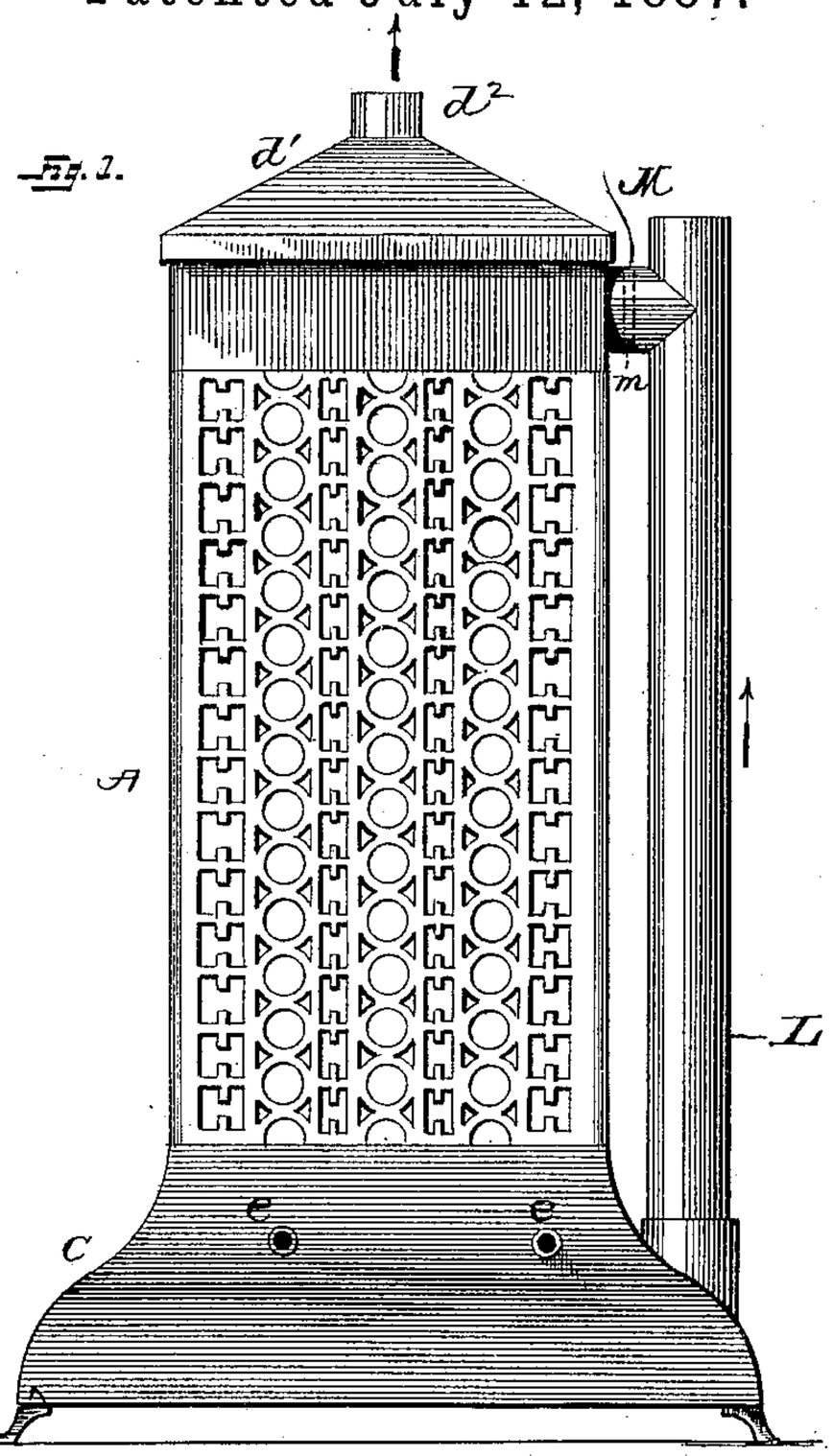


Fig. 3.

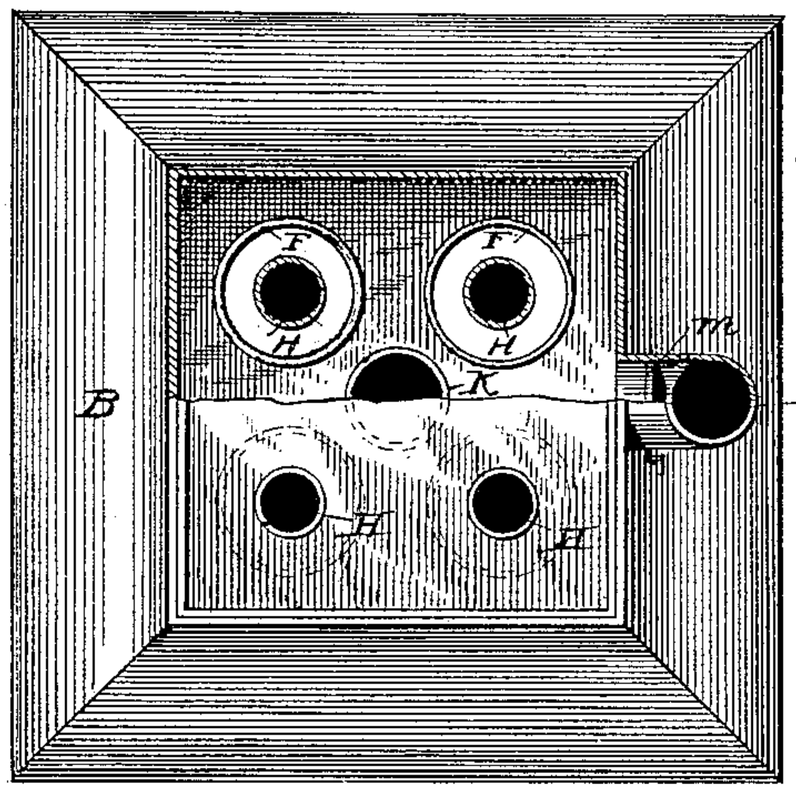
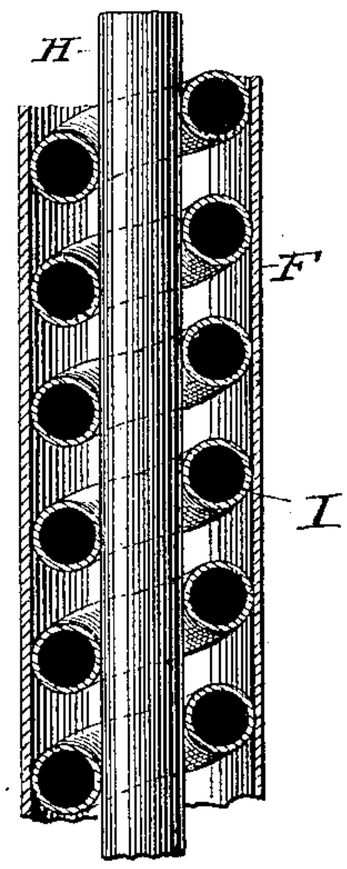


Fig. 4.



WITNESSES

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GAS OR VAPOR HEATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 366,569, dated July 12, 1887.

Application filed March 13, 1886. Serial No. 195,107. (No model.)

To all whom it may concern:

Be it known that I, ALBERT CLAYPOOL, a citizen of the United States, residing at Toledo, in the county of Lucas and State of Ohio, have invented certain new and useful Improvements in Gas or Vapor Heating Apparatus; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to heating apparatus.

The object is to produce a gas or vapor heater which shall be simple and practical in construction, which shall be efficient in heating air or water, or both, and in which heat can be economized to the greatest possible extent.

With this object in view the invention consists, essentially, in a spiral-chambered tubular gas stove or heater for emitting heat by convection and radiation and controlling the same, in which the products of combustion, being caused to take a tortuous course within the heater, in order so far as possible to give up their heat there, will part with it to pipes capable of conducting air or water, and arranged in their course; and, furthermore, in a heater in which the products of combustion, after parting with a portion of their heat in performing the function of heating air or water pipes, or both, may be passed to the base, there to part with a further portion of their heat and heat this for purposes of radiation, all as hereinafter more particularly described, and pointed out in the claims.

In the accompanying drawings, forming part of this specification, and in which like letters of reference indicate corresponding parts, I have illustrated an embodiment of my invention.

Figure 1 is a side elevation of a heating apparatus, showing the general outline thereof, with the imperforate cover in position and a hot-air duct leading to another apartment, also exhibiting the entrance of the supply-pipes for gas or oil to the burners. Fig. 2 is a central vertical section of a heater like that in Fig. 1, showing air-pipes leading from a cold-air intake through pipes which surround them, each having a spiral passage, serving as a flue for the products of combustion, into a hot-air chamber at the top provided with a perforated cover, the surrounding pipes leading into another chamber adjoining the first; also showing the escape pipe or flue to the chimney and its branch pipe having a damper; also showing a downtake-pipe to carry the products of combustion, when the damper is closed, from the chamber with which the surrounding pipes communicate to the base of the heater, and thence through the escape-pipe to the chimney, as indicated by arrows. Fig. 3 is a view, partly in plan, with both the perforated and imperforate covers of the heater removed, showing the inner pipes alone projecting into the upper chamber, and partly in cross-section on the line *x x* of Fig. 2, to show the outer pipes ending in the adjoining chamber; also showing the damper in the branch pipe. Fig. 4 is a vertical sectional view showing a modified form of device for making the spiral passage around the chamber and for conveying air or water, or both, to be heated.

In the drawings, in which I have illustrated one arrangement of my invention, A represents the body of the heater, having a casing preferably of perforated iron.

B represents the base of the heater, which at its lower part has double walls *b b'*, forming an annular or other shaped chamber, b^2.

Above the body A is a closed chamber, C, and above this chamber is another chamber, D, which is formed by a perforated cover, *d*, or may have a close or imperforate cover, *d'*, with a pipe, d^2.

In the base B, within the inner walls of the annular chamber, is arranged a burner or set of burners, E, supplied with gas, oil, or other suitable fluid fuel through pipes *e e*, provided, of course, with suitable cocks.

Leading from the upper part of the base and into the chamber C are tubes F, and leading from the base within the same below the burner, or from a cold-air intake, G, through the tubes into the top chamber, D, are uptake pipes or tubes H.

Surrounding the pipe H, within the exterior pipe or tube, F, extending from the exterior of the inner tube to the interior of the other one across the space between them, is a spirally-ar-

ranged plate, *f*, forming a spiral passage within the outer tube around the inner tube. The plate so arranged forms a spiral diaphragm. Upon this diaphragm, and so winding within the outer tube and about the inner one, is a pipe, I, for the passage of water or air, and leading from any suitable source of supply, as from below upward to any desirable point of discharge; though instead of having this pipe upon the plate-diaphragm the latter may be entirely dispensed with, and the pipe be of suitable size and be suitably arranged itself to form a spiral diaphragm, as shown in Fig. 4.

Leading from the chamber C into the annular chamber in the base is a downtake-pipe, K, and leading from the annular chamber to the chimney is the exit pipe or flue L, having a branch, M, leading from the chamber C and provided with a damper, *m*.

The covers *d* and *d'* are removable—the first for the purpose of allowing a receptacle with water to be set in the chamber, and the second to permit heated air to escape through the perforations directly into the apartment in which the heater is located, when desired. Otherwise, when the close cover *d'* is in place, the heated air from the chamber D passes through its pipe d^2 into another apartment, forming a double heater.

The heater should rest upon legs or have a perforated base, and there should be a suitable opening to reach the burners.

When the pipe I is a water-pipe, it may lead to a bath-room, and this pipe and other parts of the apparatus may be of metal or other substance or substances suitable for conducting and radiating heat.

The operation of the apparatus is as follows: The burners being lighted, the heated products of combustion ascend up the spiral passages between the tubes F H into chamber C, and taking this tortuous course are retained longer in contact with the pipes H and I, have longer time to part with their heat to the same, and so more effectively and economically heat them. After performing their function in heating the pipes I and H and the fluids passing through the same, the products of combustion may pass directly to the chimney through the branch M; but when it is desirable additionally to heat the base, whence heat is radiated directly into the apartment in which the heater is located, the damper *m* in the branch pipe M is closed, and the products of combustion then pass down the pipe K into the annular chamber b^2, further parting with their heat to this, and thence pass off up the flue L. As the pipe K may enter the annular chamber in the base on the side opposite to that of the flue, the products of combustion passing from this pipe into the chamber may be distributed around both sides of the same, and thus heat the chamber and the base equally. In other words, if a direct draft from the burners is desired, the damper is opened and the products of combustion pass directly up and off; but if it is desired to increase the heating power, by closing the damper, the products of combustion are compelled to pass down the central pipe, K, thence around the base in both directions, heating it thoroughly, and causing it to radiate into the outer air, as well as into the air passing up the tubes H when it is open within the base, and the products of combustion then pass out up the pipe L. As the air is heated in the pipe H, it passes into the chamber D, and thence, properly moistened, if desired, may either escape directly into the apartment in which the heater is located by way of the perforations in the cover *d*, or may be passed to another—an upper or adjoining apartment—by making the chamber D a closed chamber, except as to the pipe d^2, by covering it with the close cover *d'*, the heated air then escaping to the other apartment through such pipe d^2.

The arrows indicate the course of the heated currents.

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

1. In combination with the base containing a central combustion-chamber and a chamber surrounding the same, with an exit pipe or flue leading from the surrounding chamber, a tube or tubes for conveying products of combustion, a closed chamber above, into which the tube leads, a branch pipe leading from the chamber to the exit-flue and containing a damper, and a downtake-pipe from the chamber above to the chamber in the base, whereby when the damper in the branch pipe is closed the products of combustion may be returned from the chamber above to the chamber in the base, for the purpose of heating the same for radiation, substantially as described.

2. In a heater, the combination of an exterior tube for conveying products of combustion, an interior tube for the passage of air to be heated, and a pipe spirally arranged in the space between the exterior tube and the interior tube, forming a spiral passage for the products of combustion, substantially as and for the purpose set forth.

3. The combination of an exterior tube for conveying products of combustion, an interior tube for the passage of air to be heated, a chamber into which the exterior tube leads, and from which the products of combustion pass to the exit-flue, and a separate chamber into which the interior tube leads, this chamber having a perforated upper surface, being provided with an imperforate removable cover, as and for the purpose set forth.

4. In combination with a pipe for conveying air to be heated, a chamber having a perforated upper surface and provided with an imperforate removable cover having a pipe

leading therefrom, substantially as and for the purpose described.

5. The combination of an exterior tube for conveying products of combustion, an interior tube for the passage of air to be heated, a plate spirally arranged in the space between the two tubes, and a coil of pipe resting upon this plate, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

ALBERT CLAYPOOL.

Witnesses:
GEORGE ACKERMAN,
L. K. PARKS.