

(No Model.)

C. D. HOWARD.
HEATING AND VENTILATING APPARATUS.

No. 472,054.

Patented Apr. 5, 1892.

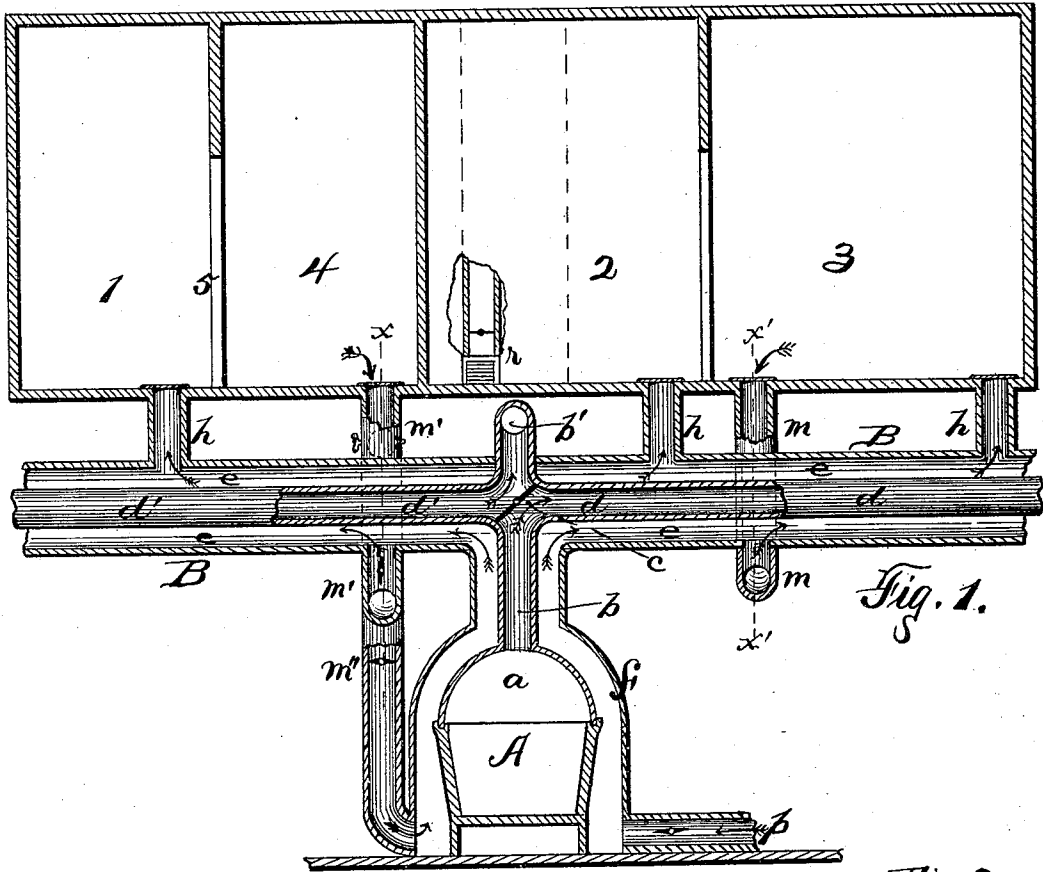


Fig. 1.

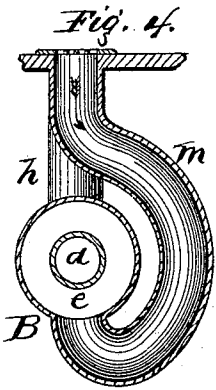


Fig. 4.

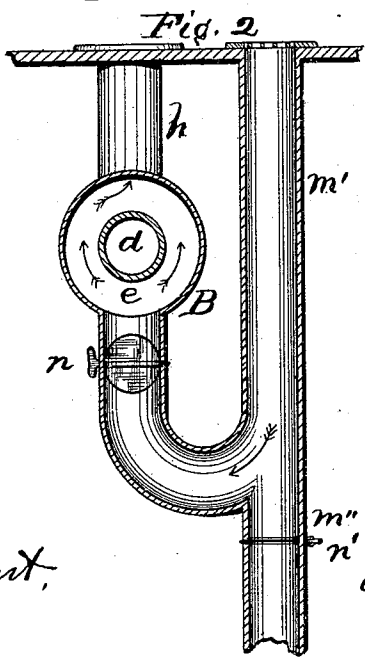


Fig. 2.

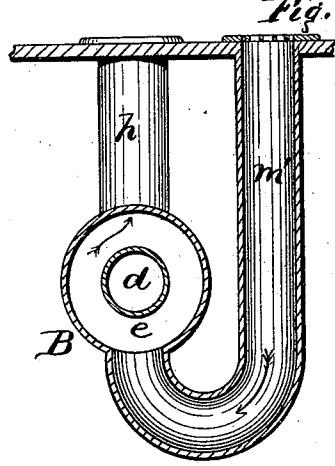


Fig. 3.

WITNESSES:
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UNITED STATES PATENT OFFICE.

CHARLES D. HOWARD, OF SYRACUSE, NEW YORK.

HEATING AND VENTILATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 472,054, dated April 5, 1892.

Application filed October 19, 1891. Serial No. 409,107. (No model.)

To all whom it may concern:

Be it known that I, CHARLES D. HOWARD, of Syracuse, in the county of Onondaga, in the State of New York, have invented new and useful Improvements in Heating and Ventilating Apparatus, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

My invention relates to heating and ventilating apparatus in which the products of combustion are all deflected, by closing the direct draft, into an elongated heating-pipe, which is inclosed within an air-pipe, so as to heat the air therein by radiation from the heating-pipe, said air-pipe being also connected to the air-heating chamber of a furnace surrounding the fire-box and combustion-chamber therein, said air-pipe being provided with register-pipes, which discharge hot air into the rooms of a building, and with cold-air pipes, which take cold air from said rooms into the air-pipe to be reheated.

The object of this invention is to so construct the cold-air conduits that they will always operate effectively without any dampers, and so that these conduits will open into the hot-air pipe at a point or points below the plane of the hot-air-discharge pipes, and so that said conduit will always contain a column of cold air of greater length than the height or vertical length of the hot-air-discharge pipes, and thereby prevent the creation of any reverse draft or suction which will cause hot air to flow through these cold-air conduits or any one of them.

My invention consists in the several novel features of construction hereinafter described, and which are specifically set forth in the claims hereunto annexed. It is constructed as follows, reference being had to the accompanying drawings, in which—

Figure 1 is a vertical section of part of my apparatus connected to a heater sufficient to show the principle of my invention. Fig. 2 is a vertical transverse section on line x in Fig. 1, showing my combined conduit adapted to conduct cold air from the room either to the air-heating chamber surrounding the heating-pipe or to the base of the heater, as desired. Figs. 3 and 4 are like sections of the cold-air conduit of different forms on line

$x' x'$ in Fig. 1, showing it as opening into the under side of the air-heating chamber.

A is a heater of any desired construction, and a is the combustion-chamber, from which the products of combustion are conducted through the pipe b direct to the chimney-pipe b' when the damper c stands vertical. This damper is mounted in the junction between the pipes b and b' and the horizontal heating-pipes $d d'$, which latter pipes are connected to the others, substantially as shown and described, and when it is turned so that it stands vertical it opens the direct draft through the pipes $b b'$ to the chimney-flue, which is indicated by the dotted lines. When this damper is turned to substantially an angle of forty-five degrees, then the direct draft is shut off and the then indirect draft will carry the products of combustion into the heating-pipe d , and as this pipe is carried around the cellar and finally is connected to and merges with the pipe d' all of these products are utilized to heat these pipes, which are, in fact, one continuous pipe, and finally pass from the pipe d' into the chimney-pipe b' and thence to the chimney. The whole circuit of this pipe is not shown, but may be readily understood.

B is a larger pipe surrounding the air-heating pipe for its whole length, but detached therefrom, creating an air-chamber e between the pipes. This pipe B is also connected by a branch to the casing f around the heater, and thus the air-chamber around the heater is connected to the air-chamber e between the pipes aforesaid. The passage of the products of combustion through the pipe $d d'$ will by radiation heat the air in the chamber e , which will pass thence through the hot-air pipes into the rooms 1, 2, and 3 of the building. The rooms 3 and 4 are shown as provided with cold-air conduits $m m'$, which extend from registers in the floor or base-board down to and around the pipe B and are shown as opening through the under side of the pipe B into the air-chamber e within it, and the cold air so taken from the room into this chamber is heated or reheated and flows through a hot-air pipe into a room. This establishes and maintains a circulation of air into and from a room or rooms. It is immaterial that the cold-air conduit should enter the bottom of the pipe B, since it is only essential that

such conduit should be longer than the vertical height of the hot-air pipe, and consequently the cold-air column will always be the longer, so that there can be no reversal or flow of hot air through a cold-air conduit. 5
 The conduit *m'* is connected to the air-pipe *m''*, and when the damper *n* is closed and the damper *n'* is opened then the cold air will flow down into the bottom of the heater, or, 10
 as shown, when the damper *n'* is closed and the damper *n* is opened then all of the cold air passing through this conduit will enter the pipe B. The heater may be also provided with a cold-air inlet *p*. In some cases 15
 I can use a ventilating-flue *r* in one room, opening into the chimney, and usually this is done when a cold-air inlet *p* is used.

In Fig. 3 the cold-air conduit is shown as opening upward through the floor at a point 20
 vertically above and on one side of the pipe B, and in Fig. 4 its opening is shown as directly above said pipe and in line with the hot-air pipes or registers.

I have, as above, described my invention 25
 as applied to hot air and the heating of it by the products of combustion; but it will be evident that with some very slight changes the heating-pipe can be used for steam or hot water, it being directly connected to a 30
 boiler in the combustion-chamber, the products of combustion being carried off by any ordinary means.

In Fig. 1 the room 3 is shown as provided with two registers, one for hot and the other 35
 for cold air, the room 2 with a hot-air register and a chimney-flue for cold air, the rooms 1 and 4 one with a hot-air flue and the other with a cold-air flue only, but with an open doorway 5 between them. This arrangement 40
 of registers is only shown as one of many. Hence I do not limit myself to this, but reserve the right to arrange them in any manner, so long as I construct the cold-air conduits of greater length than the hot-air pipes 45
 and so long as the former enter the pipe below the plane of the lower ends of the latter. It will be readily seen that the hot-air pressure is not liable to overcome the column of cold air in the cold-air conduits so as to cause 50
 the hot air to flow through them.

It will be evident that when the damper *c* is turned so as to incline the other way the products of combustion will be deflected to the left instead of to the right, as shown, 55
 thus changing their course through the pipe.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a heating apparatus, the combination, with the heating-pipes connected to a heater, of the hot-air pipes opening upward into the 60
 rooms of a building out of the top of the air-chamber in said heating-pipes and cold-air conduits opening downward from said rooms and entering the heating-pipes below the plane of the lower ends of said hot-air pipes. 65

2. The combination, with the smoke-pipe and the air-pipe inclosing it and separated therefrom, of hot-air conduits opening outward from the air-chamber between said pipes and leading upward into the apartment to be 70
 heated and cold-air conduits leading downward from said apartment and opening into the chamber between said pipes below the plane of the connection of said hot-air conduits thereto. 75

3. An apartment to be heated, a cold air conduit leading downward therefrom and having two branches, one leading into an air-chamber surrounding the smoke-pipe of a 80
 heater and the other leading to the heater and provided with deflecting-dampers, a heater, a smoke-pipe leading therefrom, and a pipe inclosing the smoke-pipe and detached therefrom and leading from said heater to said 85
 apartment. 85

4. In a double-pipe heating apparatus consisting of a heater, a smoke-pipe leading therefrom, and an air-pipe inclosing said smoke-pipe, the combination therewith of a series 90
 of hot-air conduits opening upward from the air-pipe into the apartments and cold-air conduits leading downward therefrom and connected and opening into said air-pipe at points below the plane of connection of the hot-air conduits therewith. 95

5. In a double-pipe heating apparatus consisting of a heater, a smoke-pipe leading therefrom, and an air-pipe inclosing said smoke-pipe and connected to the air-heating chamber around the heater and leading by branches 100
 into the apartments to be heated, the combination therewith of cold-air conduits leading from the apartments and opening into said air-pipe from below.

In witness whereof I have hereunto set my hand this 16th day of October, 1891. 105

C. D. HOWARD.

In presence of—
 HOWARD P. DENISON,
 C. W. SMITH.