

No. 754,293.

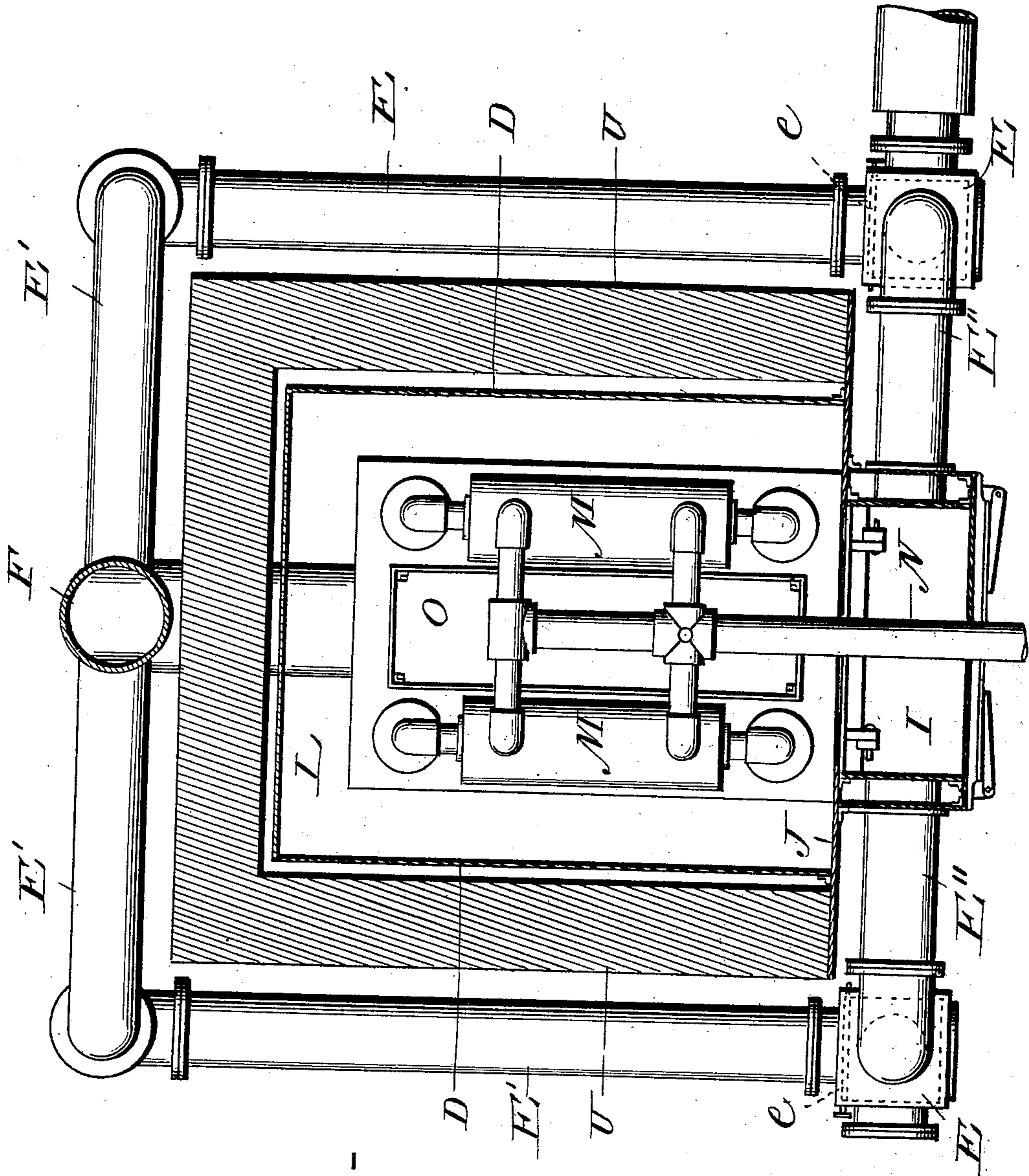
PATENTED MAR. 8, 1904.

W. M. FERRY.
HEATING AND VENTILATING APPARATUS.

APPLICATION FILED APR. 28, 1902.

NO MODEL.

3 SHEETS—SHEET 1.



WITNESSES:

Wm F. Doyle
Geo. B. Pitts

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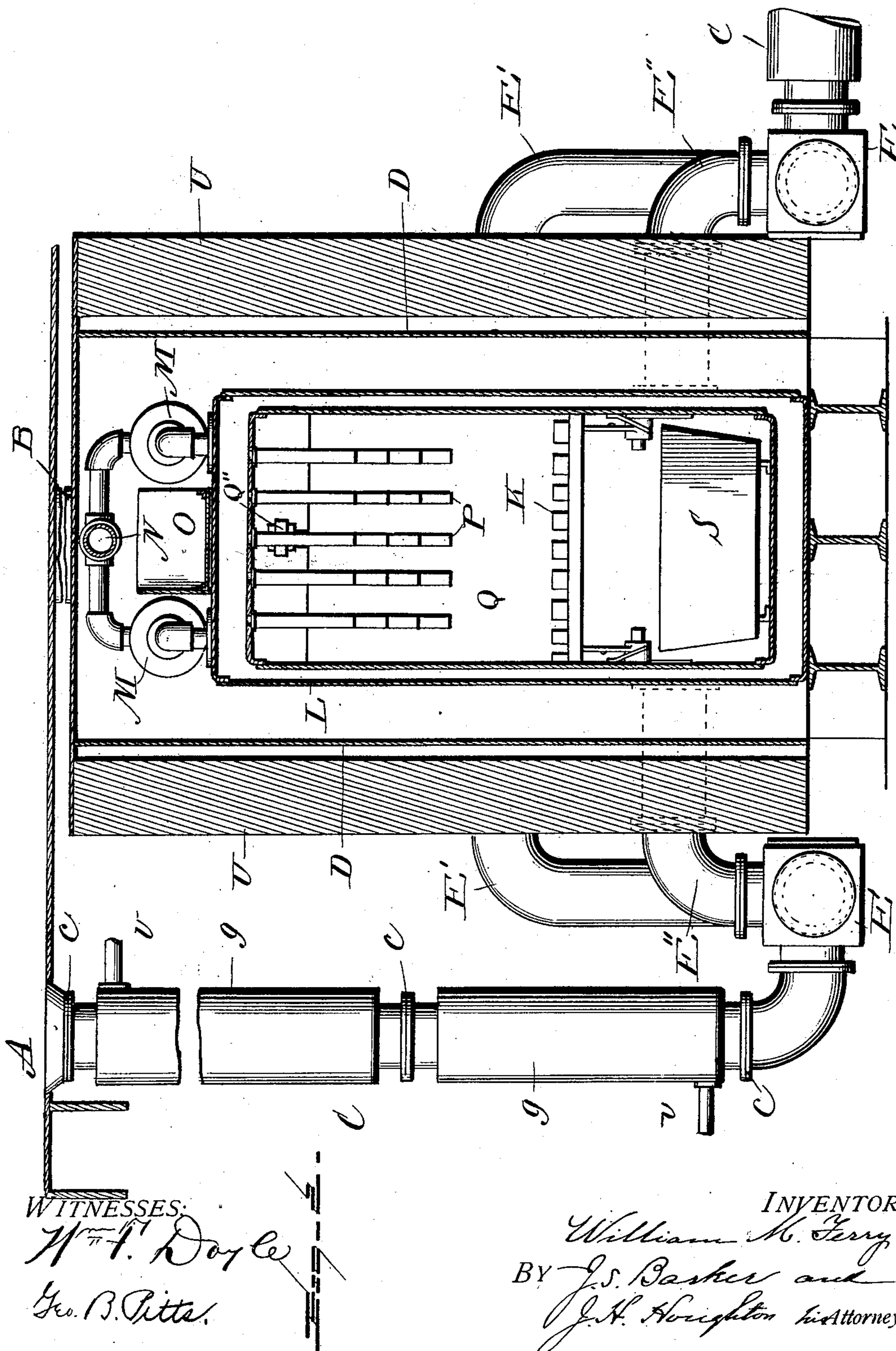
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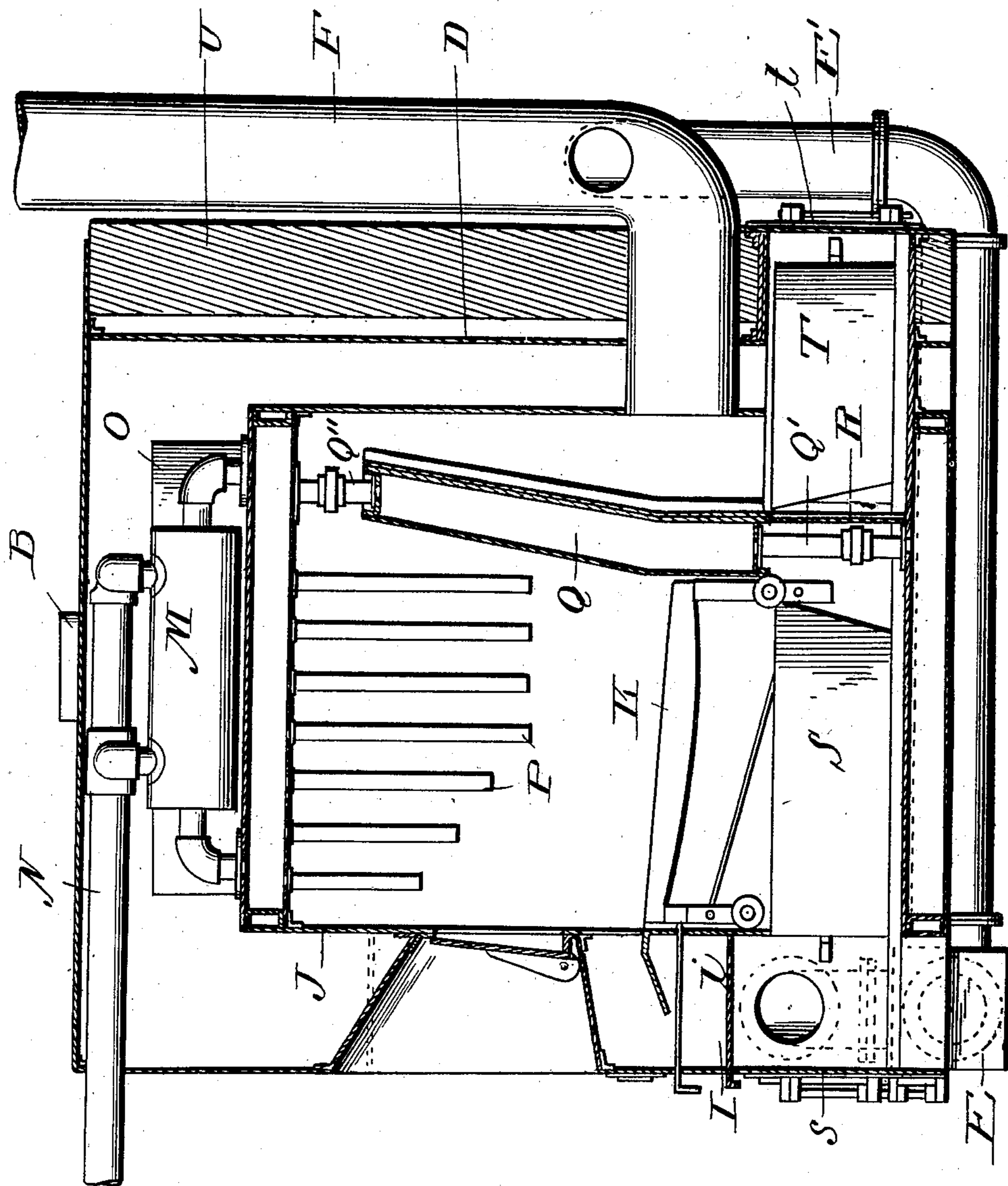
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UNITED STATES PATENT OFFICE.

WILLIAM M. FERRY, OF PARK CITY, UTAH.

HEATING AND VENTILATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 754,293, dated March 8, 1904.

Application filed April 28, 1902. Serial No. 104,993. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM M. FERRY, a citizen of the United States, residing at Park City, in the county of Summit and State of Utah, have invented a new and useful Heating and Ventilating Apparatus, of which the following is a specification.

The object of my invention is to furnish a heating and ventilating apparatus that will be economical in operation and which will serve as a means for heating one or more apartments and at the same time ventilating the same.

The apparatus which I have invented for carrying out my improvements is adapted to heat by means of either hot air, water, or steam alone or by means of both hot air and steam or hot water.

In the accompanying drawings, wherein I have illustrated the preferred form of my invention, Figure 1 is a top plan view of the apparatus, the top of the casing surrounding the furnace being removed. Fig. 2 is a front elevation of the same, parts of the casing being removed to illustrate the construction of the furnace. Fig. 3 is a central longitudinal section of the parts represented in Figs. 1 and 2.

In the drawings, A indicates a compartment which is to be heated, of which there may be many or few. Such compartment is connected with the heater by the fresh warm-air-supply pipe B and the return foul-air pipe C. The latter opens into the apartment at or near the floor plane in order to take the cold and vitiated air which naturally seeks the lower levels.

The furnace is surrounded by a jacket or casing D of suitable construction in order to produce an air-space surrounding the furnace into which the fresh air may be led from any suitable source and with the upper portion of which the supply-pipe B connects. The pipe B may be provided with a suitable damper or dampers, so as to restrict or entirely cut off the flow of heated air through it to the apartment; but I prefer that the foul-air pipe C should be always opened. The foul-air pipe C delivers into a box or casing E, preferably located near the furnace and connected by the

pipe E' with the smoke-flue F and by a pipe E'' with the fire-chamber of the furnace. A valve *e*, located in the box or casing E, is so arranged as to direct the foul air delivered through the pipe C either to the pipe E', whence it passes directly to the smoke-flue, or through the pipe E'' to the fire-chamber, where it assists in the combustion. The valve *e* may be arranged to be operated in any desired manner.

As it is the almost universal practice to locate the furnace below the level of the apartment to be heated, I prefer to cool the foul-air pipe C in order to induce a strong and positive flow of air through the same toward the furnace. This I prefer to accomplish by surrounding the pipe by a casing or inclosing pipe, through which a cooling medium, either gaseous or fluid, is caused to circulate. For this purpose I prefer to construct the foul-air pipe, either in whole or in part, as represented in Fig. 2, wherein the pipe is shown as being formed of sections arranged to be connected together end to end, for this purpose being provided with the flanges *c*, suitably perforated for the passage of connecting-bolts. Each section of the pipe is surrounded by a casing *g*, inclosing an annular chamber through which a cooling medium may be caused to circulate. The chambers through which the cooling medium flows may be connected with each other in series, if preferred.

vv represent pipes connecting with the casings *g*, one being intended to serve as an inlet and the other as an outlet for the circulation of the cooling medium. Where the foul-air pipe passes into the room or apartment in which the heater is situated, which is the usual arrangement and the one illustrated in the drawings of this case, it is quite important that that part of the foul-air pipe that is located in the upper portion of such apartment should be surrounded with a cooling medium, because the air in the upper part of such apartment is likely to become highly heated, and unless provision be made for keeping the return foul-air pipe cool as it passes through the more highly-heated regions of this apartment it will become hot,

and thus the flow of the foul air will be checked. It will be seen that the pipe which conveys the foul air to the heater is a descending one in its course, and in order to
 5 secure the full advantages of my invention it is desirable that the pipe be cooled in its upper portions or at least above where it discharges into the heater. Should the foul air in its course be carried to a level below
 10 that of its connection with the heater and the low level of the pipe be cooled, as has been proposed in the art, there is produced by such arrangement a positive check in the flow of the foul air, which flow can only be then
 15 maintained by the draft of the heater. On the other hand, by my invention a positive flow is secured irrespective of the draft.

I prefer that the pipe E'', through which the foul air may be delivered into the furnace,
 20 should not deliver directly to the latter, but rather into a chamber or casing I, situated by preference in front of the furnace and outside of the front wall J thereof. The chamber I communicates with the ash-pit of the furnace
 25 and also with the fire-chamber thereof, the grate-bars K being between these two parts of the furnace. A damper or valve *i* is so arranged as to prevent when closed the air which enters the chamber I from passing over
 30 the bed of fuel and directly into the fire-chamber. When this damper is closed, air from the chamber I is directed into the ash-pit, whence it finds its way through the bed of fuel resting upon the grate-bars K. It will
 35 thus be seen that the foul air can be given either of three courses. It can be directed around the furnace and into the smoke-stack, or it can be directed into the combustion-chamber above the bed of fuel, or caused to
 40 pass from the ash-pit through the fuel accordingly as the valves or dampers *e* and *i* are regulated.

The furnace and communicating smoke-flue may properly be termed a "conduit" through
 45 which heated vapors are passed, and the ventilating-pipe of my apparatus may be connected in different ways and at different points with such conduit, as has been described.

The furnace, which I designate as a whole
 50 as L, may be of any usual or preferred construction; but I prefer that it should be a double-wall steam-boiler furnace having the steam or hot-water drums M arranged above the furnace and connecting with the main
 55 steam or hot-water pipe N, which is connected with the radiator system in any usual or preferred way. Upon the top of the furnace and arranged between the steam or hot-water drums M may be arranged a water vessel O,
 60 which is for the purpose of supplying moisture to the air which is delivered through the fresh-air pipe B. The steam-boiler furnace is preferably provided with a series of drop-tubes P and a hollow water bridge-wall Q
 65 back of the fire-chamber and connected at the

top and bottom through the pipes Q'' Q' with the upper and lower water-spaces of the boiler. The space below and in front of the bridge-wall Q is cut off from the space below and in rear thereof by a slide-plate or damper
 70 R. The space in front of this damper is the ash-pit of the furnace and is adapted to receive an ash pan or receptacle S, while the space in the rear is adapted to receive the soot-box T. The casing of the furnace is provided with
 75 suitable openings and doors *s* and *t* to permit the ready removal of the pans or receptacles S and T. By removing the slide or damper R access may be had from the front to the soot-chamber, which is sometimes desirable
 80 when the furnace is so set as to make it inconvenient to open the rear door *t* or when making repairs.

The furnace may be set in a suitable inclosure of brick, masonry, or other material,
 85 as indicated at U.

It will be understood that the furnace is provided with the usual and necessary accessories, such as a safety-valve, water-gage, try-cocks, &c.; but I do not deem it necessary to
 90 either illustrate or describe these well-known parts.

By means of an apparatus such as I have described it is possible to regulate the temperature of the apartment and at the same
 95 time insure its ventilation. The apartment may be heated by means of radiators or by heated air delivered through the pipe B or by both of these means; but which ever way be employed the apartment is ventilated through
 100 the duct C.

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

1. In a heating and ventilating system, the
 105 combination of a heater for an apartment, a descending ventilating-pipe leading from the apartment to the heater, and means for cooling the descending portion of the said ventilating-pipe, substantially as set forth.
 110

2. The combination of a discharge-conduit through which heated vapors are passed, a descending ventilating-pipe leading from an apartment and connected with the said discharge-pipe, and means for cooling the descending portion of the said ventilating-pipe,
 115 substantially as set forth.

3. In a heating and ventilating system, the combination of a furnace, a descending ventilating-pipe leading from an apartment to be
 120 heated and ventilated to the furnace, the said pipe passing in its course downward through the furnace-room, and means for cooling the descending portion of the ventilating-pipe situated within the furnace-room, substantially
 125 as set forth.

4. In a heating and ventilating system, the combination of a discharge-conduit through which heated vapors are passed, a descending ventilating-pipe leading from an apartment
 130

and connected with the said discharge-conduit, and means for cooling the descending portion of the ventilating-pipe arranged above the level of the connection of the ventilating-pipe with the discharge-conduit, substantially as set forth.

5 5. In a heating and ventilating system, the combination with a discharge-conduit through which heated vapors pass, a ventilating-pipe leading from an apartment connected with such conduit, and a series of connected chambers adapted to contain a cooling medium surrounding the descending portion of the ventilating-pipe, substantially as set forth.

15 6. In an apparatus for heating and ventilating buildings, the combination of a steam or hot-water heater having an internally-located fuel-grate, and a casing surrounding such heater arranged to receive and heat fresh air,

flues connecting the air-space of the said casing with the apartment to be heated and ventilated, a descending return or foul-air pipe leading from the apartment back to the heater, the descending portion of the said return or foul-air pipe being jacketed whereby it is adapted to be kept cool by a cooling medium circulating in the jacket of the pipe, and means for directing the foul air passing through the said pipe either into the smoke-stack or under the grate or into the combustion-chamber above the grate accordingly as such means are adjusted, substantially as set forth.

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Witnesses:

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