

No. 662,473.

Patented Nov. 27, 1900.

A. G. SÖDERLUND & F. W. LÖNNBECK.  
VENTILATING AND HEATING APPARATUS.

(Application filed Mar. 4, 1899.)

(No Model.)

3 Sheets—Sheet 1.

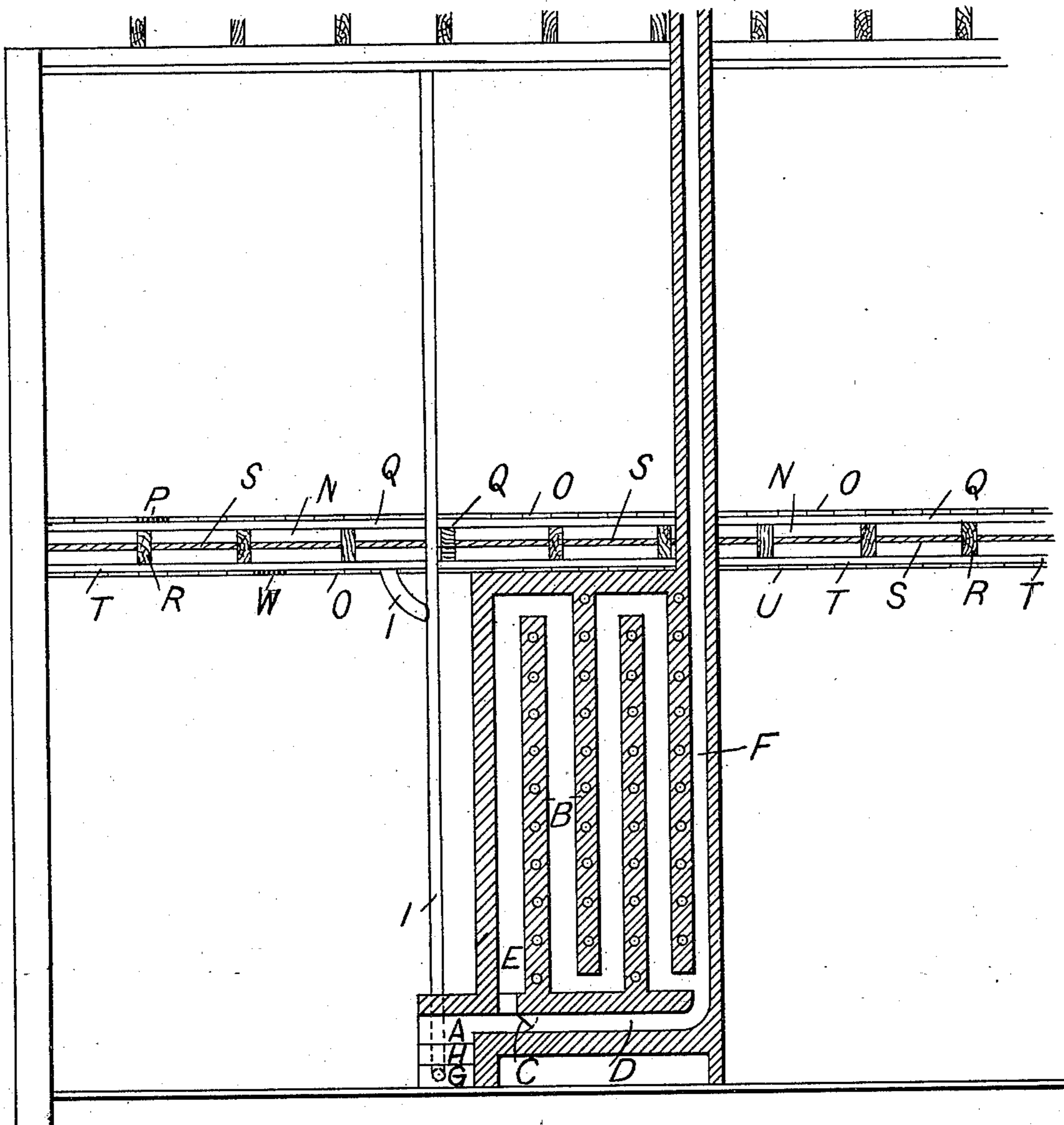


FIG. 1.

Inventors.

Witnesses

*H. A. Knight*  
*B. F. Hall*

*Anders Gustav Söderlund*  
*Fredrik Waldemar Lönnbeck*  
By *Harry C. Knight*  
*Atty.*

No. 662,473.

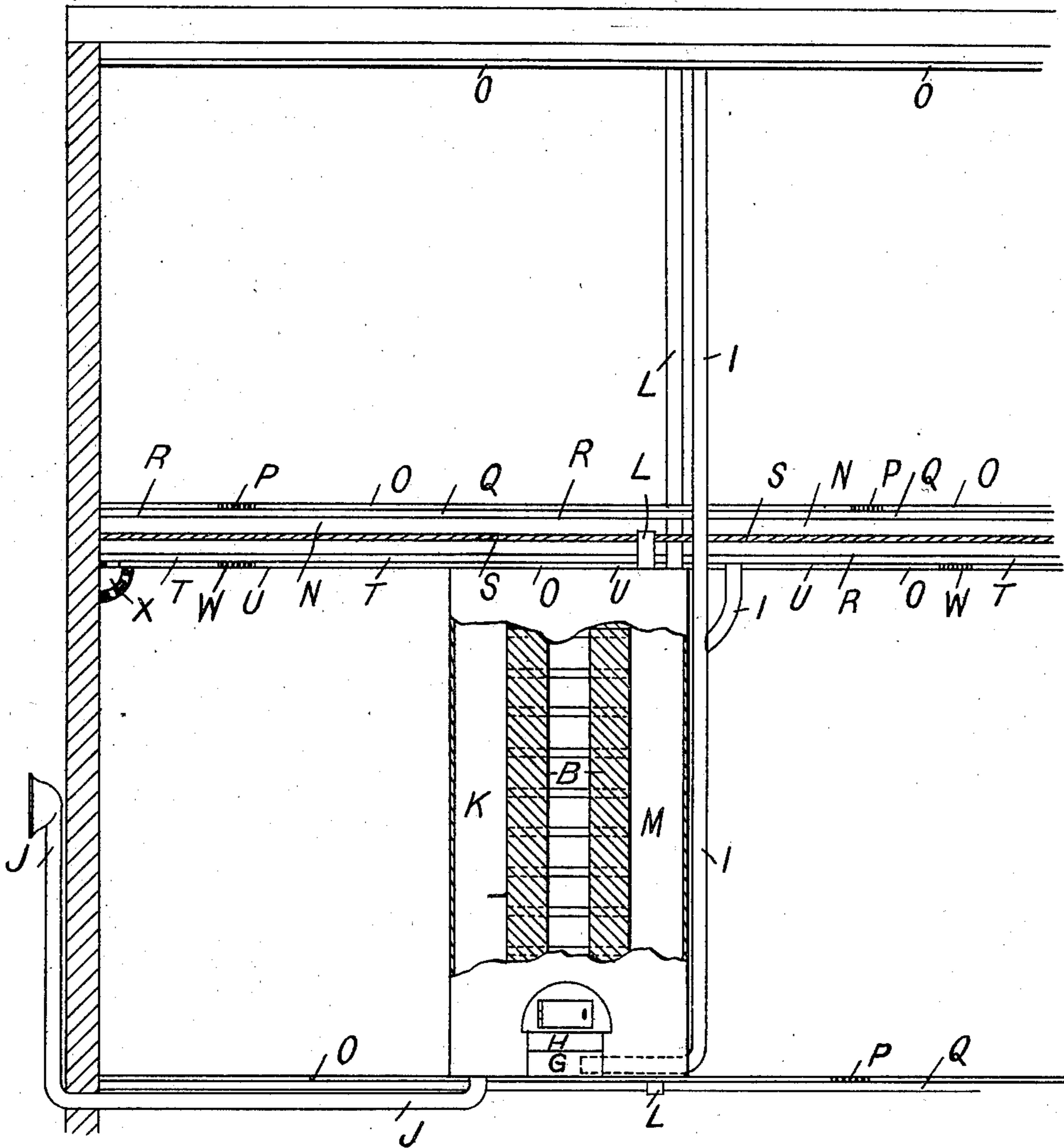
Patented Nov. 27, 1900.

A. G. SÖDERLUND & F. W. LÖNNBECK.  
VENTILATING AND HEATING APPARATUS.

(No Model.)

(Application filed Mar. 4, 1899.)

3 Sheets—Sheet 2.



Witnesses

*H. A. Knight*  
*B. F. Hoff*

FIG. 2. Inventors

*Anders Gustav Söderlund*  
*Gredrik Waldemar Lönnbeck*  
By *Harry E. Knight*  
*Att'y.*

No. 662,473.

Patented Nov. 27, 1900.

A. G. SÖDERLUND & F. W. LÖNNBECK.  
VENTILATING AND HEATING APPARATUS.

(Application filed Mar. 4, 1899.)

(No Model.)

3 Sheets—Sheet 3.

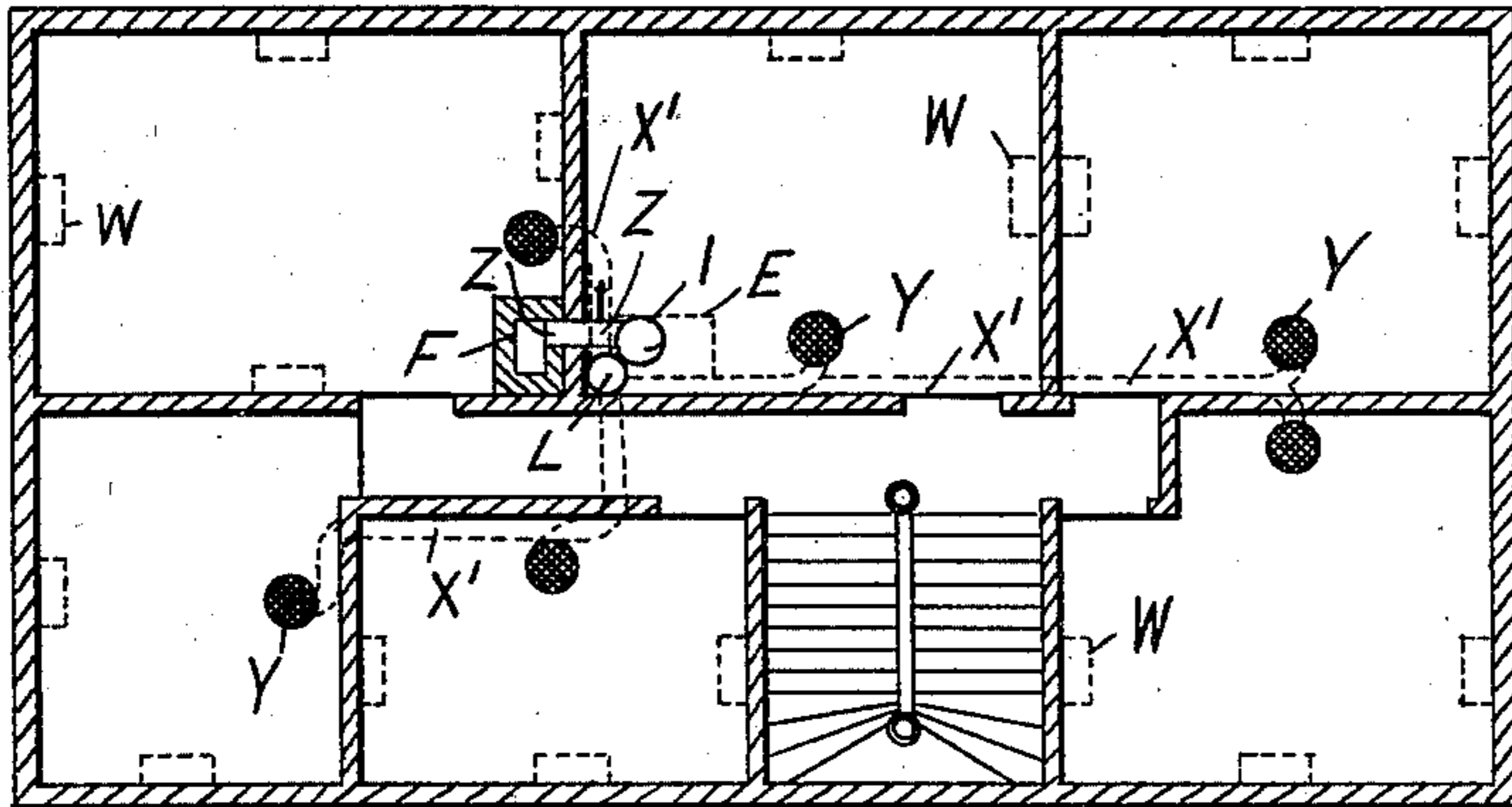


FIG. 3.

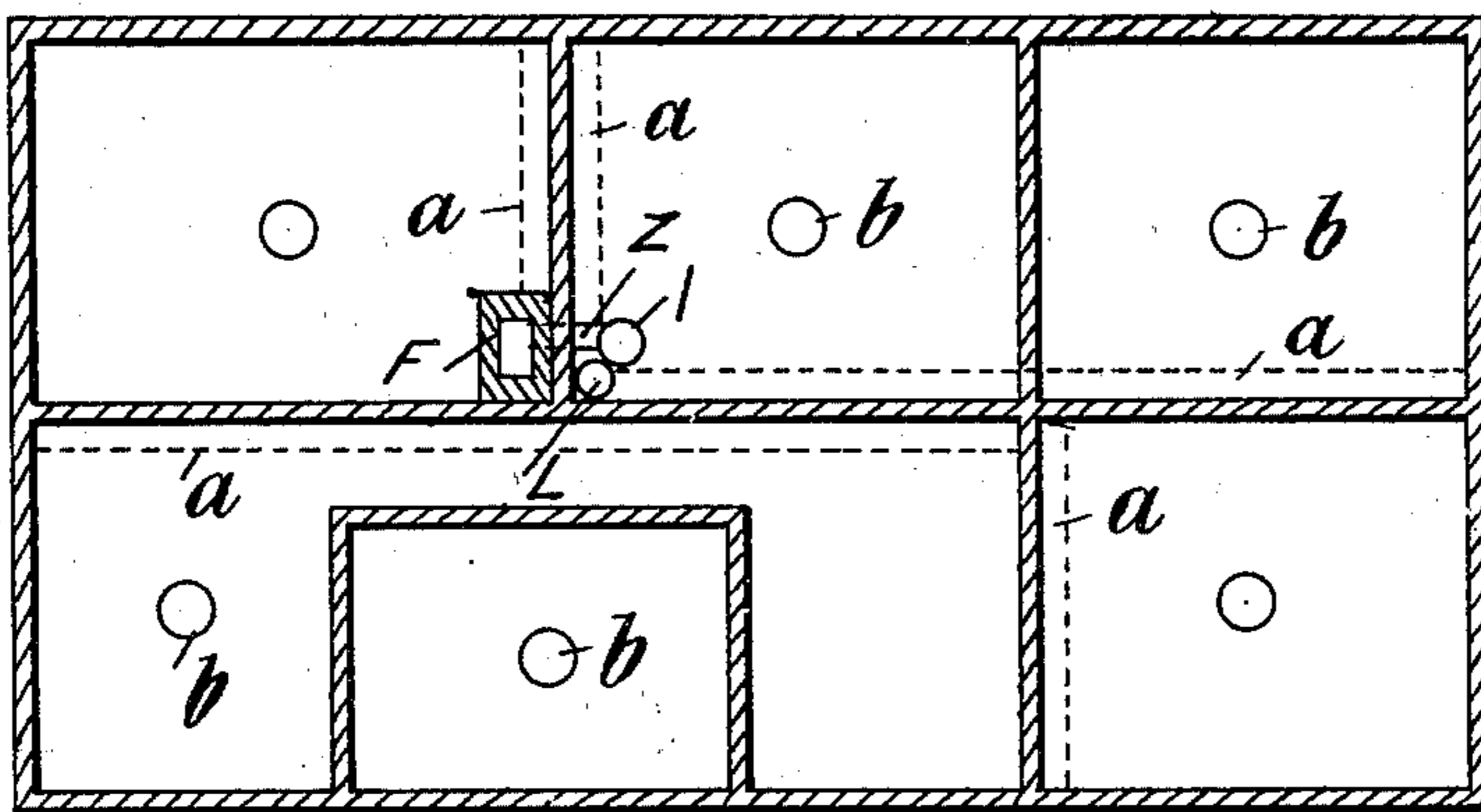


FIG. 4. Invertors

Witnesses

*H. W. Knight*  
*B. F. Wall*

*Anders Gustaf Söderlund*  
*Frederik Waldemar Lönnbeck*  
By *Harry O. Knight*  
*Atty*

# UNITED STATES PATENT OFFICE.

ANDERS GUSTAF SÖDERLUND, OF STOCKHOLM, SWEDEN, AND FREDRIK WALDEMAR LÖNNBECK, OF EKENÄS, RUSSIA; SAID SÖDERLUND ASSIGNOR TO SAID LÖNNBECK.

## VENTILATING AND HEATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 662,473, dated November 27, 1900.

Application filed March 4, 1899. Serial No. 707,733. (No model.)

*To all whom it may concern:*

Be it known that we, ANDERS GUSTAF SÖDERLUND, a subject of the King of Sweden and Norway, residing at Stockholm, in the Kingdom of Sweden, and FREDRIK WALDEMAR LÖNNBECK, a subject of the Emperor of Russia, residing at Ekenäs, Finland, in the Empire of Russia, have invented certain new and useful Improvements in Ventilating and Heating Apparatus, of which the following is a specification.

This invention relates to warming and ventilating buildings usually by means of a single furnace, and consequently with the greatest economy of fuel. This is effected by an apparatus in which fresh air from outside is admitted through a warming apparatus to the various rooms of the building and the vitiated air is withdrawn from these various rooms to the fireplace of the warming and ventilating apparatus.

The invention is best described by aid of the accompanying drawings, which illustrate our apparatus as applied to a building.

Figure 1 is a transverse view showing two floors and ceiling of a building with the heating apparatus of the type described in our application, Serial No. 726,991, filed August 12, 1899; Fig. 2, a view of the said two floors and ceiling and heating apparatus depicted at right angles to Fig. 1; Fig. 3, a plan view of house, showing conduits and floor-openings; Fig. 4, plan view of same house, showing conduits for foul air and openings for same in ceiling.

Like letters relate to like parts on all the drawings.

Referring first to Figs. 1 and 2, A is the furnace-flue; B, heating apparatus substantially as described in the other application above referred to; C, a damper which can be arranged to cut off the entrance to the horizontal flue D or to the vertical flue E of the heating apparatus as required. When the vertical flue E is cut off, the products of combustion go at once through the horizontal flue D to the chimney F and warm the same. When the chimney is warmed and there is a draft, the damper is made to close flue D and the heat goes through the heating apparatus.

G is a foul-air room below the furnace H; I, the foul-air pipe taking the foul air from the various ceilings and delivering it to the foul-air room G below the furnace. This foul-air room can be of any desired size.

J, Fig. 2, is a pipe taking the air from the outside into the cool-air chamber K of the heating apparatus, and L a hot-air pipe leading from the hot-air chamber M to the space N N in the floors, as hereinafter described. Air-tubes *k* extend across. The floor and ceiling of each room are composite, the floor being composed of an impervious stratum O, having occasional apertures P for admitting air into the room.

Q Q are strips forming an air-space above the joists R, and between the various joists is an impervious partition S. Below the joists are strips T, forming an air-space above the impervious ceiling U. In small houses the hot-air furnace B is in the kitchen-flue.

The mode of action is as follows: Cold air from outside is brought through the pipe J to the cold-air chamber K of the heating apparatus. Hot air from the hot-air chamber M of the heating apparatus passes through the pipes L to the space beneath the various floors kept open by the strips Q. The air rises through the grids P in the flooring into the rooms. The air escapes through grids W in the ceiling or through perforated cornices X into the space between the strips T in the ceiling. From thence it is carried by conduits I to the foul-air room and passing through the furnace is burned and escapes into the open air.

Referring to Figs. 3 and 4, hot air is brought from the furnace E to the more distant rooms by conduits X' preferably along the walls of the rooms behind the skirting-boards, there being openings in these conduits direct to the space below the floor kept open by the strips Q. In the floor or in the skirting-board openings P admit the air into the room, or in old houses, where the spaces between the joists and the ordinary floors are used, as conduits from the conduits behind the skirting-boards, lead the air to grating Y in any convenient position in the floor or wall. Fig. 4 shows a plan view of the ceiling in which I is the ex-

haust-downflue placed in any convenient position, conduits *a* in the perforated cornices of the room bringing the foul air to the down-conduit. Near the top of this down-  
 5 conduit we prefer to place a branch *Z*, with a damper, as shown, usually closing the same, but capable of being opened, so as to take the air from the top of the down-conduit direct to the chimney *F*. In some cases the con-  
 10 duits *a* are in the wall itself and connected with the hollow ceiling. In this case openings *b* can be placed in the ceiling in any convenient part for the exit of the foul air. It is often convenient to place these around a  
 15 central chandelier.

We claim as our invention—

1. A heating and ventilating arrangement comprising joists, a floor having openings, a ceiling having openings, a furnace, a furnace-  
 20 flue, an air-heating apparatus having a flue with which the furnace-flue is connected, air-flues extending across the heating apparatus, a cold-air chamber located on one side of the heating apparatus, a hot-air chamber located  
 25 on the other side of the heating apparatus, a foul-air room located beneath the furnace, a foul-air pipe connecting the space above the ceiling with the foul-air room, and a hot-air pipe connecting the hot-air chamber with the  
 30 space beneath the floor.

2. A heating and ventilating arrangement

comprising joists, a partition dividing the space between the joists, strips secured across the joists beneath and above the same, a ceiling having openings and secured to the  
 35 lower strips, a floor having openings and secured to the upper strips, a furnace, a furnace-flue, an air-heating apparatus having a flue with which the furnace-flue is connected, air-flues extending across the heating apparatus,  
 40 a cold-air chamber located on one side of the heating apparatus, a hot-air chamber located on the other side of the heating apparatus, a foul-air room located beneath the furnace, a foul-air pipe connecting the space beneath  
 45 the partition with the foul-air room, and a hot-air pipe connecting the hot-air chamber with the space above the partition.

In witness whereof we have hereunto signed our names, this 1st day of February, 1899, in  
 50 the presence of subscribing witnesses.

ANDERS GUSTAF SÖDERLUND.  
 FREDRIK WALDENAR LÖNNBECK.

Witnesses to signature of Anders Gustaf Söderlund:

BERTHA GALLÉN,  
 ANNA GOLOUCTSHEFF.

Witnesses to signature of Fredrik Waldemar Lönnbeck:

HILDUR ALM,  
 JOHAN AHLITROIN.