

(No Model.)

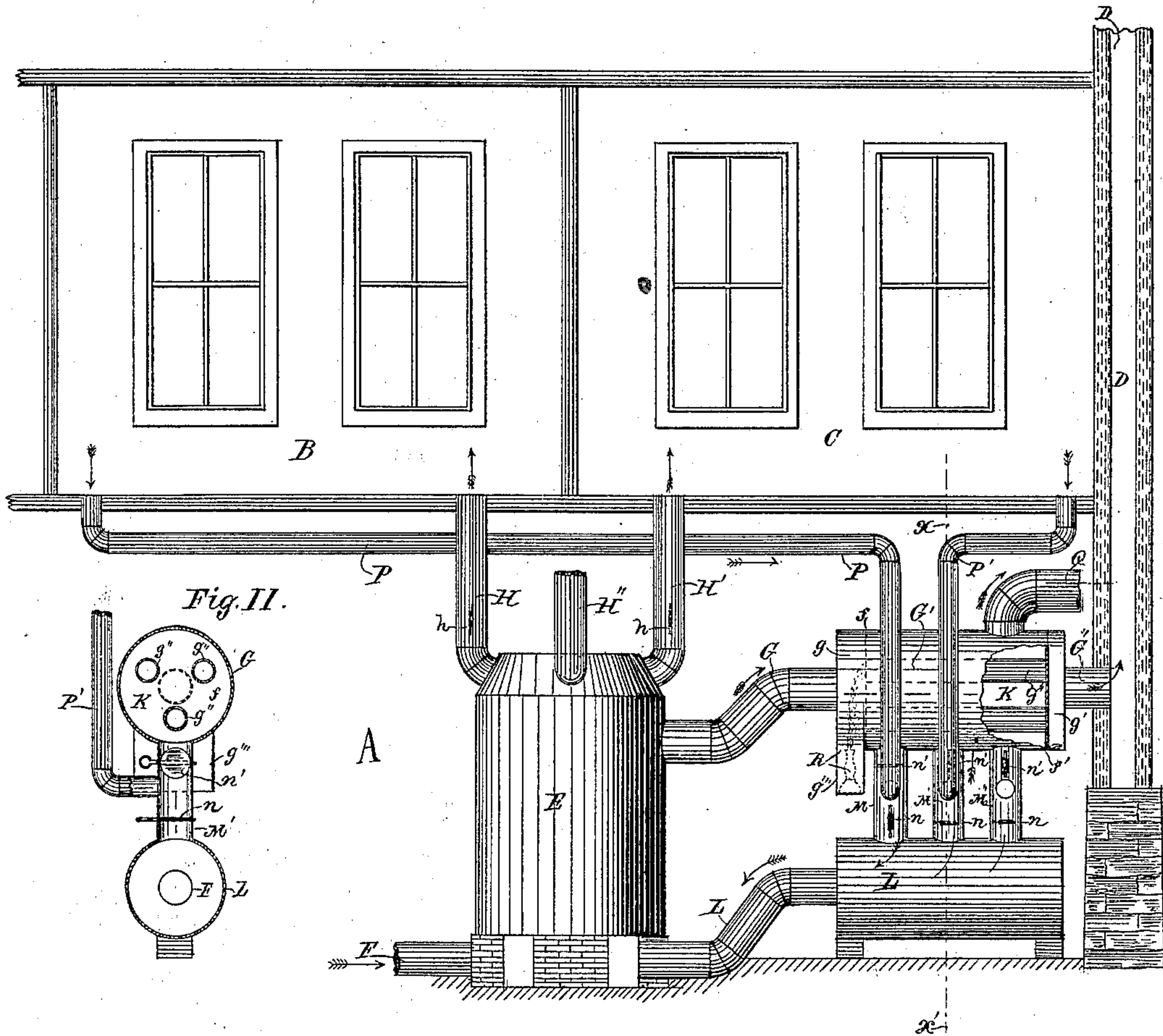
E. T. JOHNSON.

MEANS FOR HEATING AND VENTILATING BUILDINGS.

No. 395,395.

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Fig. I.



Witnesses
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MEANS FOR HEATING AND VENTILATING BUILDINGS.

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To all whom it may concern:

Be it known that I, EDWIN T. JOHNSON, a citizen of the United States, and a resident of the city of Minneapolis, county of Hennepin, State of Minnesota, have invented a certain new and useful Improvement in Means for Heating and Ventilating Buildings, of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to heating and ventilating apparatus, and it has for its object to effect an economy of fuel along with perfect ventilation by a system which will permit the unused air of unoccupied rooms to be revolved continuously through the heater, while the used air of the occupied rooms is removed and carried to the outside of the building and a current of fresh warm air is supplied to take its place. This I accomplish by a construction which utilizes the waste heat from the exit-flue of the furnace to produce the necessary forced draft for drawing the air from all the various rooms, and which will permit the air from one room to be returned through the heater or be passed out of the building, or will permit the air from one or more of the rooms (such as are unoccupied) to be returned, while that from one or more of the other rooms (such as are occupied) is passed out of the building.

In the drawings, like letters referring to like parts, Figure 1 is a side elevation of my apparatus in position for work, a part of a building being shown in section; and Fig. 2 is a vertical cross-section on the line X X' of Fig. 1.

A is the basement, and B and C are two living-rooms of an ordinary building.

D is a chimney extending from above the roof to the basement of the building.

E is the heating-furnace, of any suitable kind.

F is the fresh-air-intake pipe, and G G' G'' constitute the exit-flue of the same.

H H' H'' are hot-air flues leading to the various rooms to be heated. Of these the flues H H' are shown complete, supplying hot air to the living-rooms B and C, respectively, and may be provided with small dampers *h*.

The central section, G', of the exit-flue consists of a large drum having end chambers,

g g', partitioned from the central part and connected by a series of comparatively small flues, *g''*, whose open ends terminate in the partition-walls *f f'*. The chamber *g* is connected by G directly to the furnace, and the chamber *g'* is connected by G'' directly to the chimney. The space included between the partition-walls *f f'* and the periphery of the central part of the drum inclosing the branches *g''* of the exit-flue thus constitutes a heating-chamber, K, which is utilized to effect the forced draft.

Directly beneath the draft-chamber K is located a drum, L, which is connected directly to the cold-air chamber of the furnace E. Pipes M M' M'', &c., connect the drum L and the draft-chamber K. As many are used as there are rooms to be heated and ventilated. In each of these connecting-pipes are placed a pair of dampers, *n n'*.

P is an outlet air-duct leading from the floor of the room B and communicating with the pipe M between the dampers *n n'*, and P' is a similar air-duct from the room C, and connecting in a similar way with the pipe M'. Every other room in the building is provided with a similar air-outlet duct communicating in a similar way with pipes connecting the drums K and L.

Q is a foul-air-outlet pipe leading directly from the draft-chamber K to the outside of the building.

The chamber *g* of the drum G' is extended below the level of the body of the drum, forming a small combustion-chamber, *g'''*, adapted to receive a small fire-pot or oil-stove, R, which may be employed to assist in starting the forced draft, and will prove of service both for the more rapid kindling of the fire and for starting the cold air out of the living-rooms. A door in *g'''* gives access to burner R. After the fire in the furnace is once well established the fire in the chamber *g'''* may be dispensed with.

The operation is evident from the description already given. By the dampers *n n'* any one of the air-outlet ducts from the various rooms may be put into communication with one of the drums K or L and cut off from the other. If connected with L and cut off from K, as is the duct P in the drawings, the air

from the corresponding living-room, as B, will be continuously revolved through the furnace, while if cut off from L and connected to K, as is P' in the drawings, the air from the corresponding living-room, as C, will be forced into the outlet-pipe Q and carried to the exterior of the building.

It is evident that all may be connected to one drum and cut off from the other, or several to one and several to the other. A complete system is thus afforded for independently heating and ventilating the various occupied rooms and of heating the unoccupied rooms without wasting coal in raising the temperature of large volumes of unused air. This is a great economy in house heating and ventilation.

It is evident that instead of a single furnace or heater a large number may be used, all having their exit-flues passing through the draft-chamber K and having pipes from their cold-air chambers to the drum L. I use such a construction in applying my system to large buildings. It is equally evident that the specific construction of the draft-chamber K may be varied. For example, instead of the end chambers, partitioned from the body of the drum, with several connecting-flues, the exit-flue may be a single continuous pipe and the draft be an inclosed drum mounted on the same; or the exit-flue may have a part enlarged into a drum, and the outlet air-ducts may have branches, one passing to said drum or through the same to the foul-air outlet, and the other passing directly to the furnace, with a damper in each branch for cutting off from the furnace and connecting with the drum, or conversely. The relative location of L and K may also be changed. Instead of L being below K, it may be to one side of the same.

It is a leading feature of this construction that the waste heat in the exit-flue is utilized to effect the forced draft; but it is apparent that a supplementary heater might, if necessary, be used for the purpose and the draft-chamber be disconnected entirely from the exit-flue. The fuel required to maintain the forced draft would be materially less if there were many unoccupied rooms than would be required to heat the requisite quantity of fresh air from the intake-pipe. The burner R is in a small way such a supplementary heater, though my use of it is in the main simply as a device for re-enforcing or initiating the draft. In the summer time, however, I may use the burner R in connection with the chamber K, the outlet Q, and the ducts P P', &c., to effect good ventilation.

It is also evident that with dampers in the hot-air flues any given room—as, for example, a sleeping-room—can be ventilated or have its foul air removed by my apparatus without taking any hot air from the furnace. Reliance can be placed on the leakage about the windows and doors for the supply of the requisite fresh air. If the furnace be inadequate to supply heat to all the living-rooms, stoves or grates may be used to give the desired heat, and my apparatus be used solely to force the ventilation.

What I claim, and desire to secure by Letters Patent of the United States, is as follows:

1. The combination, with a hot-air furnace having hot-air flues to the various rooms of a building, of an air-heating receptacle or draft-chamber inclosing the exit-flue of said furnace and having a foul-air outlet, an air-receptacle outside said furnace and communicating with the same, independent pipes connecting said outside air-receptacle and draft-chamber and provided each with a pair of dampers, and air-outlet ducts from the various rooms to said connecting-pipes, uniting each with its respective pipe at a point between said dampers, substantially as described.

2. The combination, with a hot-air furnace having hot-air flues to the various rooms of a building, of an independent air-heating receptacle or draft-chamber having a foul-air outlet, independent air-outlet ducts from the various rooms, each having a connection to said draft-chamber and a connection to said furnace, and dampers in said connections for throwing any and all of said ducts into communication with said draft-receptacle or with said furnace at will, substantially as described.

3. The combination, with a hot-air furnace having hot-air flues to the various rooms of a building, of an independent air-heating receptacle or draft-chamber having a foul-air outlet, an air-receptacle in communication with said furnace and sets of independent pipes, corresponding to the number of rooms, connecting said receptacles and provided each with a pair of dampers, and independent air-outlet ducts from the various rooms to said connecting-pipes, uniting each with its respective pipes at a point between said dampers, substantially as described.

EDWIN T. JOHNSON.

In presence of—

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