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R. EVANS ET AL

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HEATING SYSTEM

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Fig. 1.

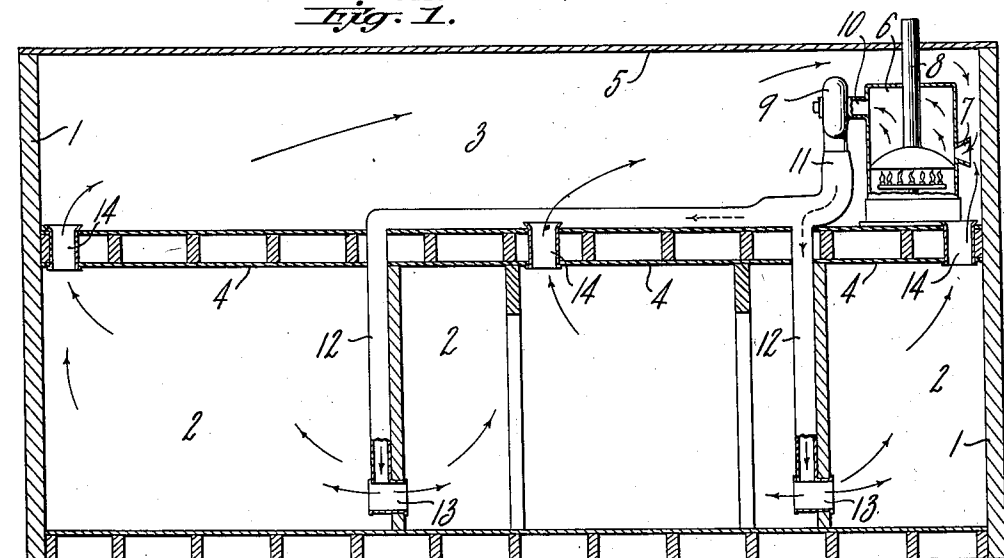


Fig. 2.

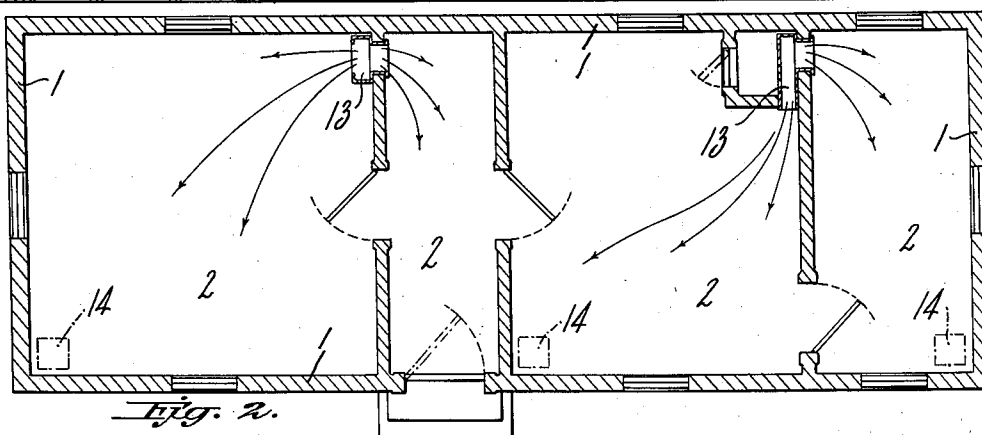
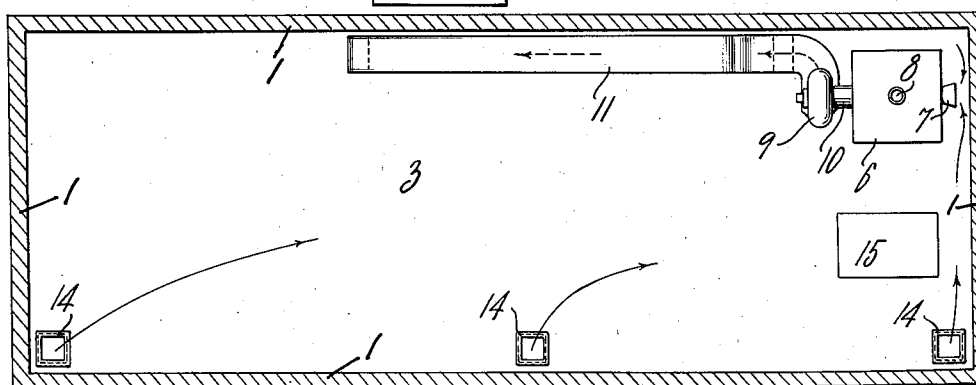


Fig. 3.



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HEATING SYSTEM

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5 Claims. (Cl. 237-47)

This invention relates to air heating systems for buildings having one or several or all of the rooms substantially covered by an attic which is sealed at its top and sides to the exterior, the building preferably being a small, single-story residence with its main rooms on the ground floor. The air heater of the system is preferably located in the attic but may merely open into the interior thereof, and likewise there is preferably located in the attic the means, such as a fan, for maintaining a difference of air pressure in the interiors of the room or rooms and the attic whereby a circulation of heated air is maintained therebetween.

The primary object of the invention is to maintain a circulation of heated air in a building in such manner as will provide an inexpensive and efficient heating system by reason of the circulation not only in the room or rooms which are generally occupied but also in the attic which then acts as an effective heat insulator between the ceiling of the room or rooms and the exterior of the building.

Another object is to utilize the attic as a large and usually unobstructed chamber or duct of the heating system in which is contained at least a portion, and preferably all, of a main duct, for conducting the heated air between the heater and the branch ducts for the rooms, the attic being capable also of containing if desired the air heater and the fan so that loss of heat from the heating system is conserved and the loss from the building minimized, and so that the cost of construction of the building is reduced.

Other objects and advantages will appear from the following description of the preferred arrangement for a single-story residence as an example, and from the accompanying drawings thereof in which

Fig. 1 is an elevational cross section of a building in which, as an example, the attic is arranged over all the rooms on the ground floor and the air heater and a fan are located in the attic; Fig. 2 is a plan view of the ground floor thereof; and Fig. 3 is a plan view of the attic thereof.

Referring to the drawing, reference numeral 1 represents end walls of suitable construction, 2 represents interconnected rooms on the ground floor, and 3 represents the attic arranged over the ceilings 4 and sealed to the exterior by the roof 5 and the upper parts of the side and end walls 1 by the complete absence of openings therethrough and suitable wall boards secured thereto. The gas-fired air heater 6 with an air inlet 7, having a damper if desired, is located in

the attic to preclude the necessity for a basement or the use therefor of a portion of the ground floor and to permit a short chimney or flue 8, with a damper if desired, for the discharge of products of combustion from the furnace of the heater. A fan 9, located alongside the heater 6, is connected to the air outlet thereof by the air duct 10 and also to a main air duct 11 which has branches 12 extending to registers 13 in the lower parts of the rooms 2. Other air ducts 14 extend through the ceilings 4 of the rooms to connect the interiors of the rooms and attic. A trap door 15 or the like provides access to the attic.

When the outdoor temperature is sufficiently low, gas preferably but if desired electricity or other kind of fuel preferably requiring no pump or cartage for supplying it to the heater and preferably adapted to the use of suitable temperature controlling devices in the rooms, is utilized for heating the air in the well known manner. The fan 9 is operated, preferably electrically, to draw air from the interior of the attic 3 into the inlet 7 of the heater 6 where it is heated to a suitable temperature and if desired also cleansed, purified and humidified. The heated air is then forced by the fan 9 through the main air duct 11 extending within the attic, and thence through the branched air ducts 12 and registers 13. The resulting reduction of air pressure in the attic and the increase of air pressure in the rooms assist the natural tendency of the heated air to rise through the rooms from the registers to the ceilings and to pass through the air ducts 14 back into the interior of the attic from whence it is again drawn into the heater for reheating. In this circulation, the heated air is mixed with accretions of fresh air naturally leaking through windows and doors of the rooms, thereby maintaining the air within the rooms and attic at a sufficient degree of purity.

The heated air circulating in the attic acts as an effective insulator for the ceilings 4 against the colder temperature on the outside of the roof 5 and the upper parts of the end walls and the side walls 1. Furthermore, as a result of the absence of loss of any substantial amount of heated air from the rooms and attic to the exterior of the building, and also since the heat radiated and conducted from the heater 6, the interior portion of the chimney or flue 8 and the main air duct 11 heats the air in the attic, the amount of gas or other heating medium consumed by the heater in maintaining the desired

temperature throughout the building is reduced. Furthermore, by locating the heater and fan in the attic, no basement or extension is required and the cost of constructing the building is reduced thereby and also by the possibility of a shorter chimney or flue 8. In effect the attic constitutes a sealed chamber or duct from which the air to be heated is drawn and in which is arranged the main supply duct for the heated air for the rooms below. By omitting partitions and other obstructions in the attic as shown, the circulation of the heated air in the rooms and attic is enhanced and the volume of heated air forming the source of supply for circulation therein and for the insulation of the ceilings 4, is increased. The air for combustion of the gas in the furnace of the heater may be heated air taken from the interior of the attic or air taken from outdoors through a duct.

If desired, the air heater or the fan or both may be located elsewhere than in the attic, in which case the heater would merely have an opening into the interior of the attic and the main air duct 11 would merely have a portion in the attic. Also, if desired, the air heater may be located in the attic but enclosed therein by a fire-resistive partition or door, in which case the heater would likewise have an air opening, whether inlet or outlet, extending into the interior of the attic for circulation of the heated air. Furthermore, in any of these arrangements, the heating system could be arranged to discharge the heated air from the heater into the interior of the attic and withdraw it from the rooms through the main duct 11. Still other modifications may be made without departing from the spirit of the invention as defined in the appended claims.

Having thus described our invention, what we claim is:

1. The combination with a building having a room, of an attic extending over substantially the entire room and sealed to the exterior of the building, a heating system for the building comprising an air heater located in the attic and having an opening into the interior thereof, an air duct connected to the heater and extending within the attic, a second air duct connecting the first one to the interior of the room, and a third air duct connecting the interiors of the room and attic whereby a path of circulation for the heated air is provided from the heater to the room to the sealed attic and to the heater from the attic for reheating and recirculation thereof in an efficient manner, said sealed attic providing an effective heat insulator between the ceiling of the room and the exterior of the building, and means for maintaining a difference of air pressure between the interiors of the room and attic whereby the heated air is maintained in circulation in said path.

2. The combination with a building having a room, of an attic extending over substantially the entire room and sealed to the exterior of the building, a heating system for the building comprising an air heater located in the attic and having its air inlet opening into the interior thereof, an air duct connected to the air outlet of the heater and extending within the attic, a second air duct connecting the first one to a lower part of the interior of the room, and a third air duct extending through the ceiling of the room and connecting the upper part of the interior of the room to the interior of the attic whereby a path of circulation for the heated air is pro-

vided from the heater to the room to the sealed attic and to the heater from the attic for reheating and recirculation thereof, and means for maintaining a lower air pressure in the interior of the attic than in the room to maintain the heated air in circulation in said path.

3. The combination with a one-story building having a plurality of rooms on the ground floor thereof, of a substantially unobstructed attic extending over substantially the entire ground floor and sealed to the exterior of the building, an air heating system for the building comprising an air heater located in the attic and having an inlet opening into the interior thereof, an air duct connected to the air outlet of the heater and extending along the attic, a plurality of air ducts branching individually from the air duct along the attic to the lower parts of the respective rooms, and a plurality of air ducts extending individually through the ceilings of the respective rooms into the interior of the attic whereby a path of circulation for the heated air is provided from the heater to the rooms to the sealed attic and to the heater from the attic for reheating and recirculation thereof, and a fan located in the attic and connected to the heater to maintain a lower air pressure in the interior of the attic than in the rooms whereby heated air is maintained in circulation in said path.

4. The combination with a building having a room, of an attic extending over substantially the entire room and substantially sealed to the exterior of the building, a heating system for the building comprising an air heater located in the attic and having an opening into the interior thereof, an air duct connecting said heater to the interior of said room, and a second air duct connecting the interiors of the room and attic whereby a path of circulation for the heated air is provided from the heater to the room to the attic and to the heater from the attic for reheating and recirculation thereof in an efficient manner, said sealed attic providing an effective heat insulator between the ceiling of the room and the exterior of the building, and means for maintaining a difference of air pressure between interiors of the room and attic whereby the heated air is maintained in circulation in said path.

5. The combination with a building having a plurality of rooms, of a substantially unobstructed attic extending over said rooms and substantially sealed to the exterior of the building, an air heating system for the building comprising an air heater located in the attic and having an inlet opening into the interior thereof, an air duct connected to the air outlet of the heater, a plurality of air conduits branching individually from said air duct to the lower parts of the respective rooms, and a plurality of air channels extending individually through the upper parts of the respective rooms into the interior of said attic whereby a path of circulation for the heated air is provided from said heater to the rooms to the sealed attic and to the heater from the attic for reheating and recirculation thereof, said sealed attic providing an effective heat insulator between the ceiling of the rooms and the exterior of the building, and means connected to the heater for maintaining a different pressure in the interior of the attic than in the rooms whereby the heated air is maintained in circulation in said path.