

Dec. 5, 1944.

H. S. JOHNSON

2,364,220

BUILDING

Filed July 10, 1942

6 Sheets-Sheet 1

Fig. 1

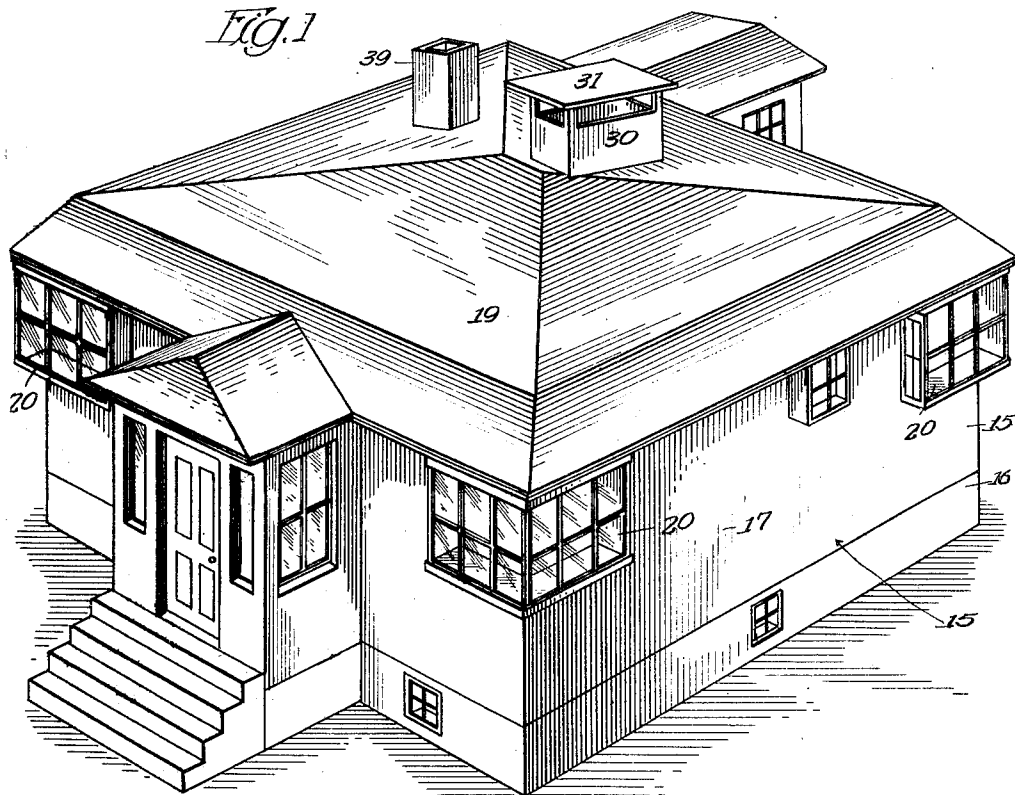
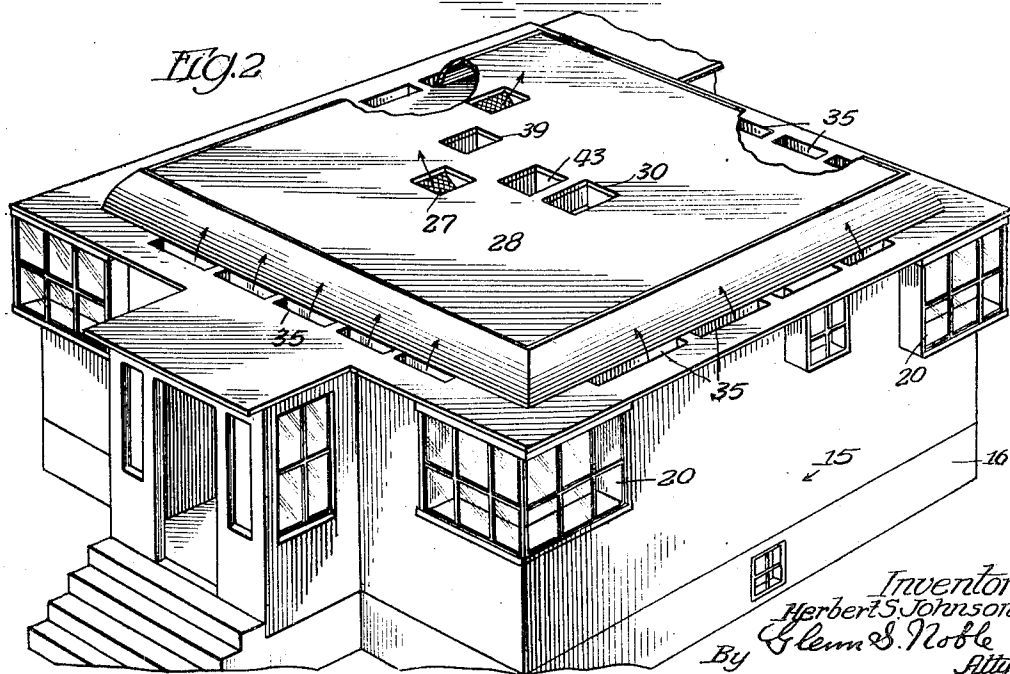


Fig. 2



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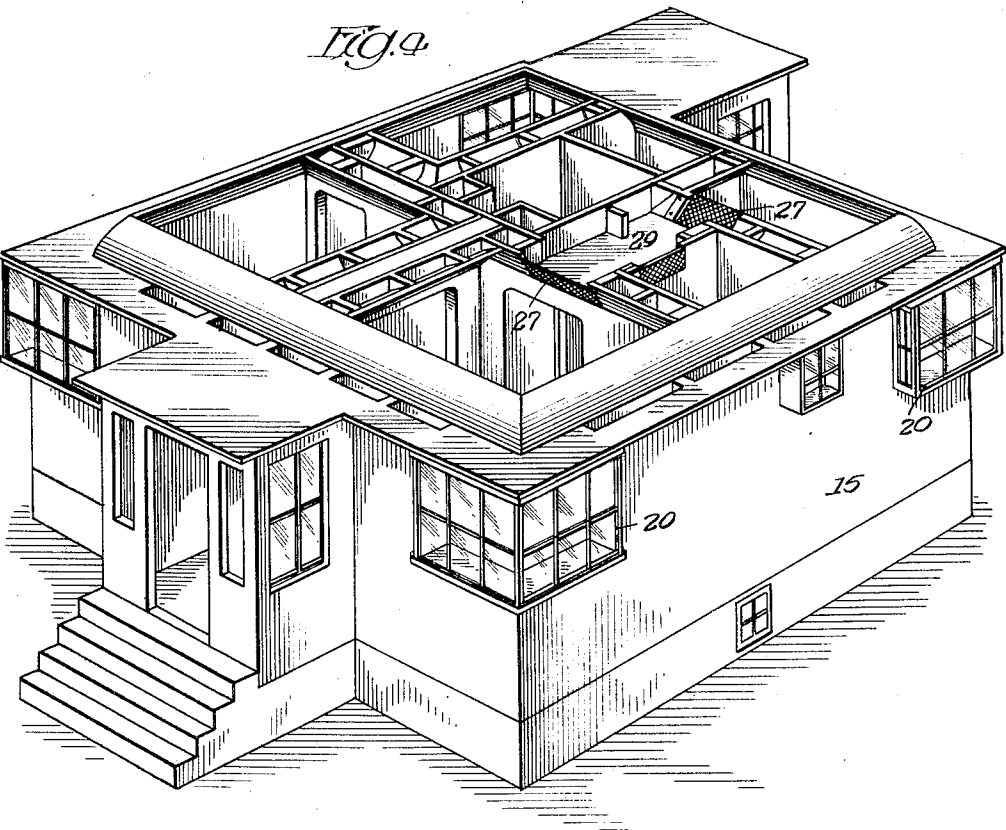
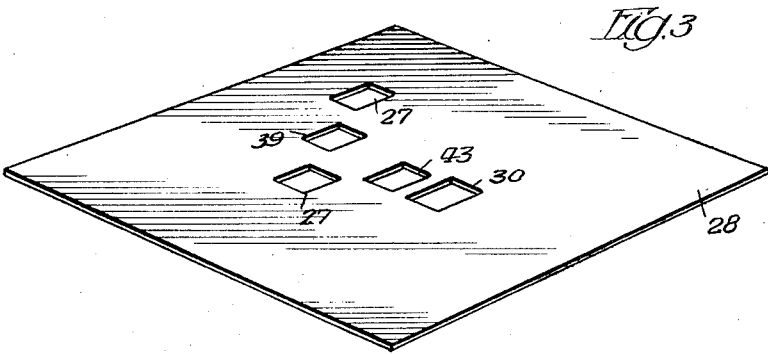
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6 Sheets-Sheet 2



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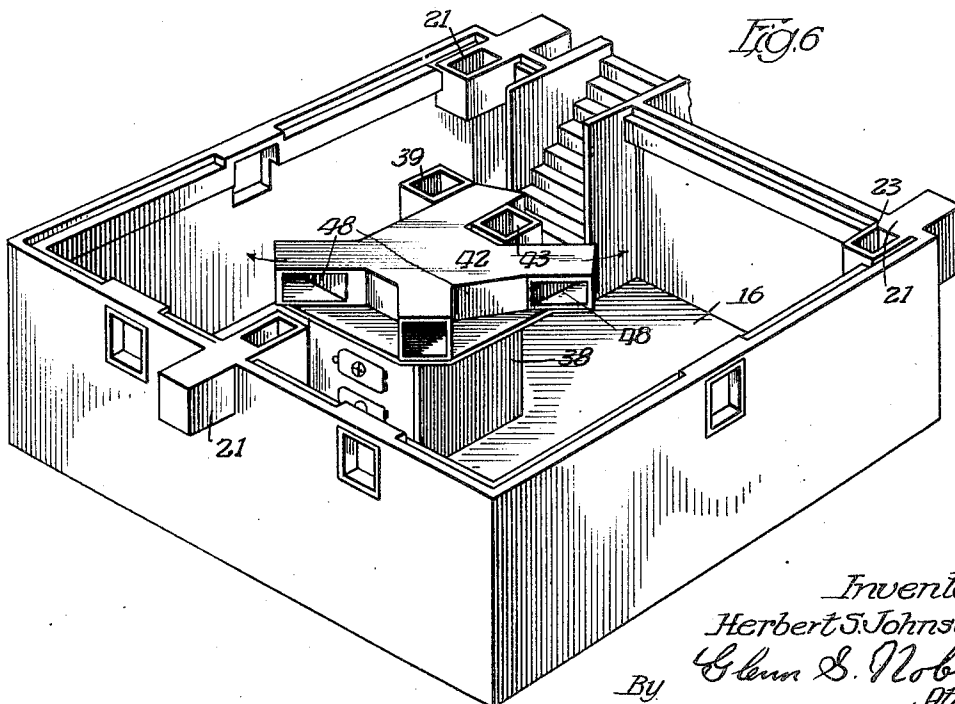
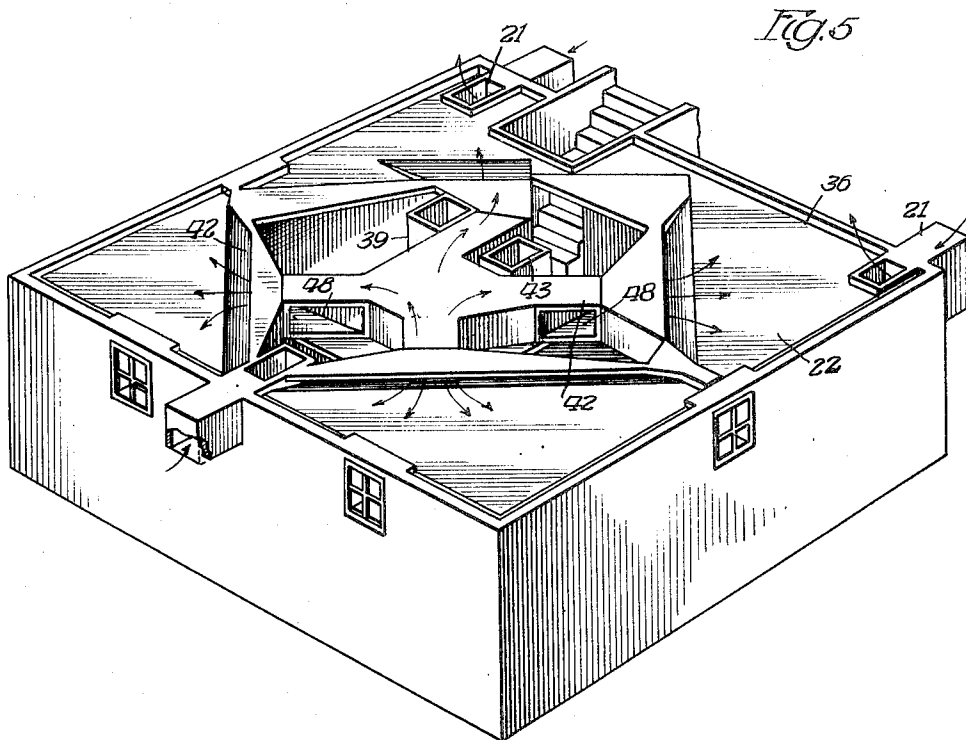
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6 Sheets-Sheet 3



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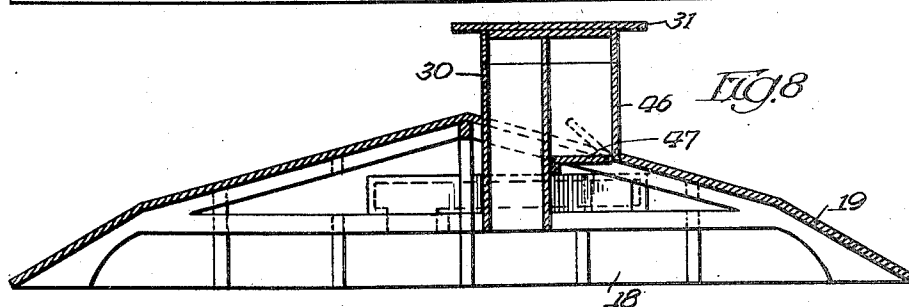
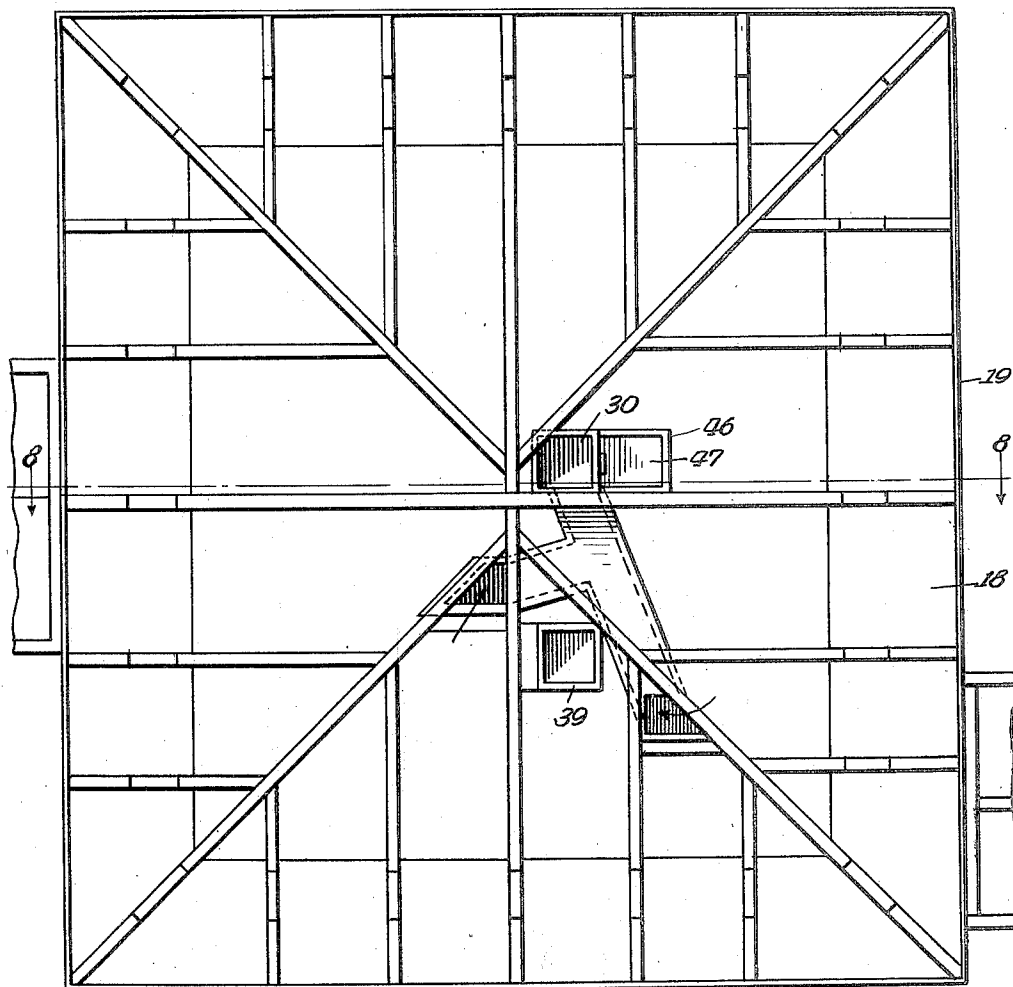
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Fig. 7



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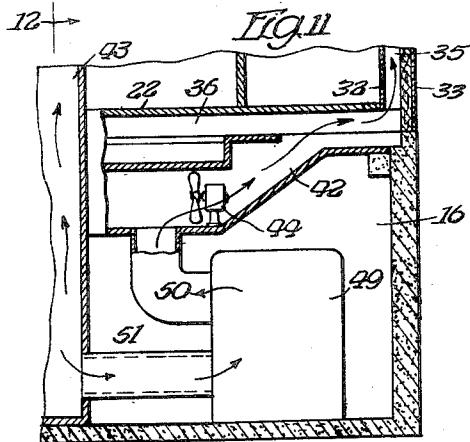
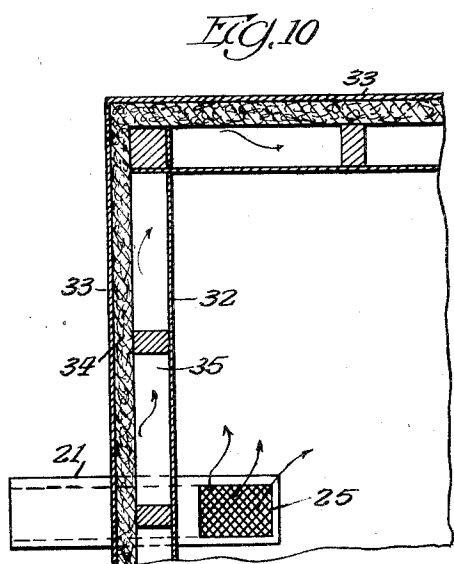
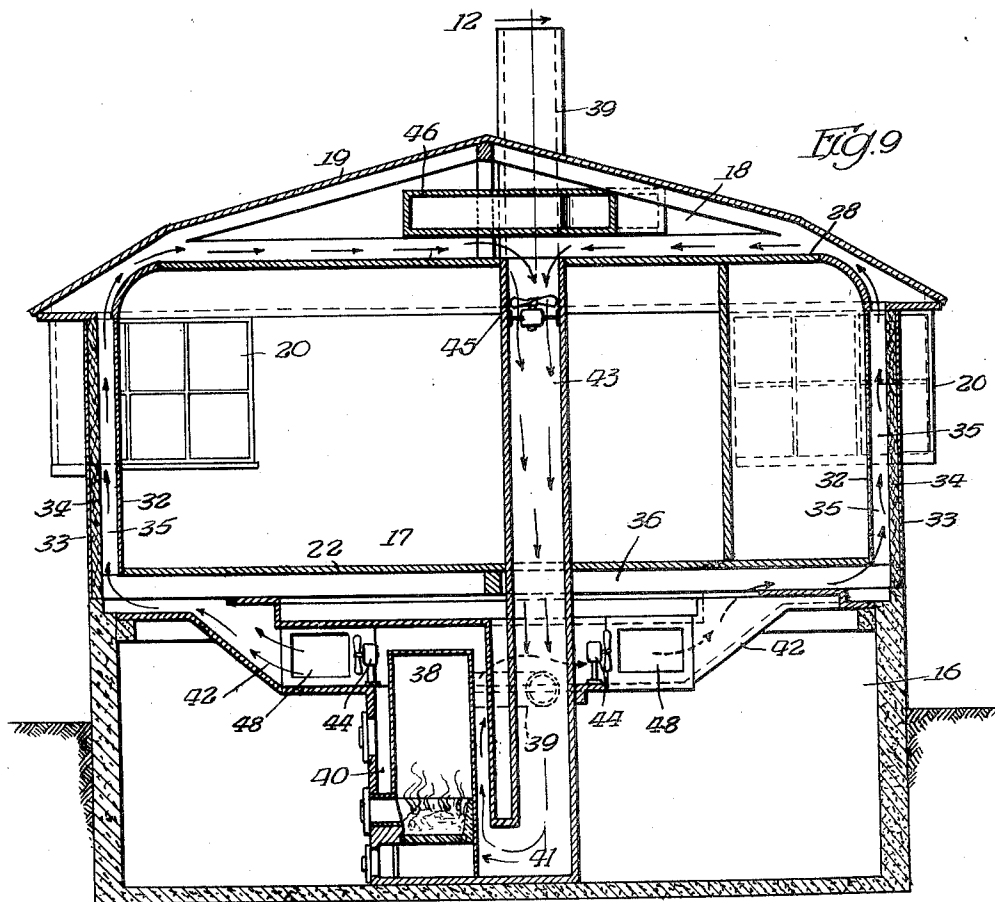
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BUILDING

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6 Sheets-Sheet 5



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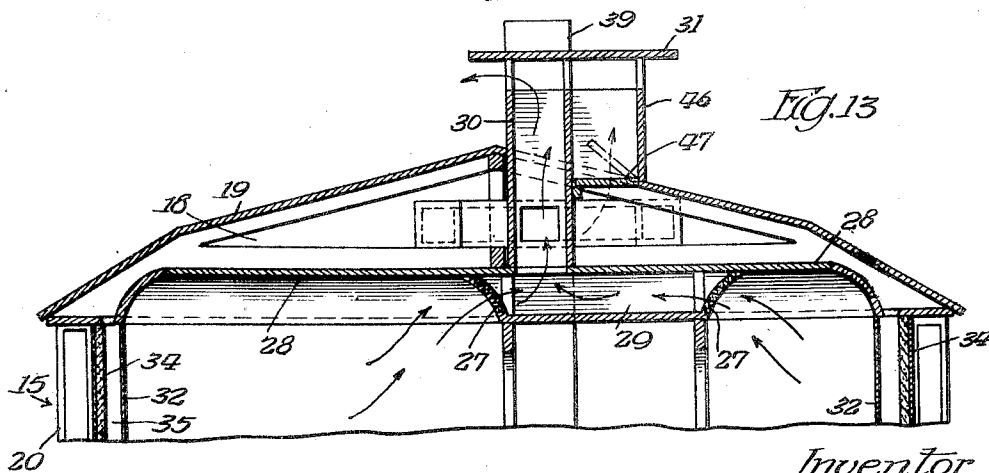
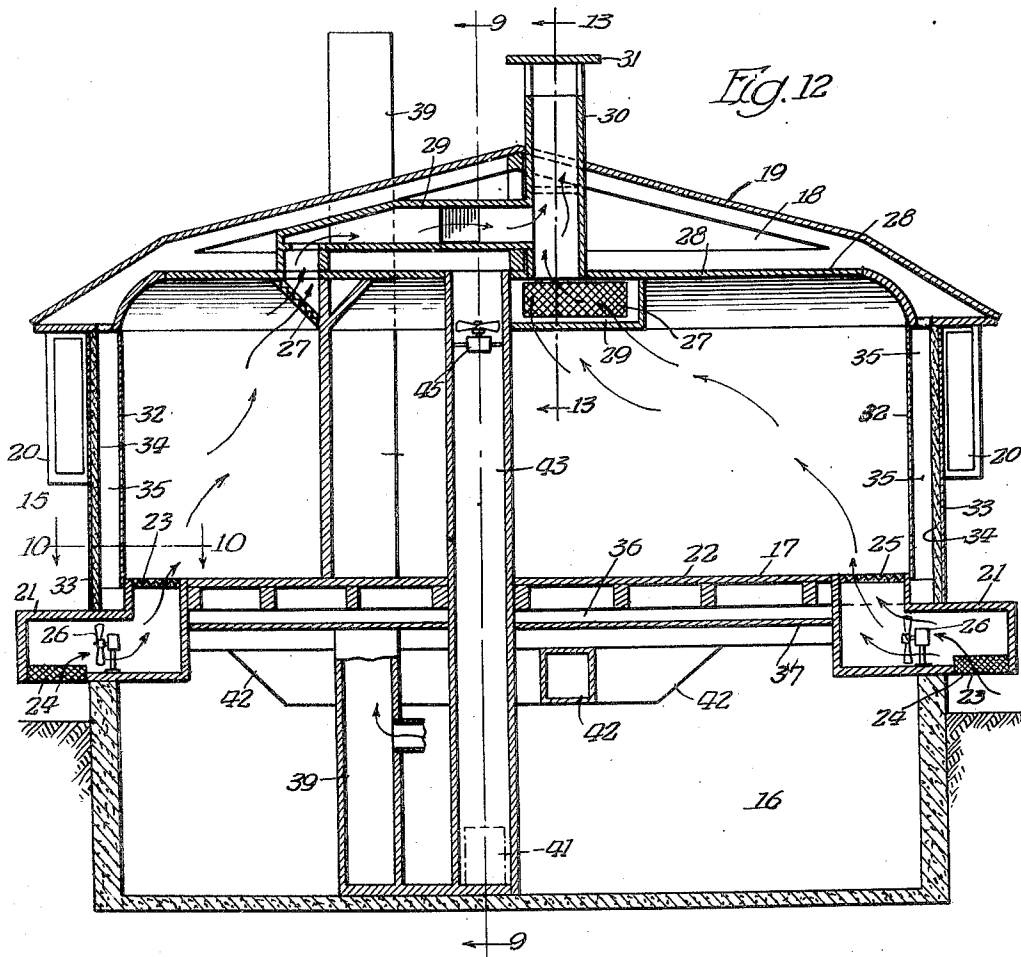
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BUILDING

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UNITED STATES PATENT OFFICE

2,364,220

BUILDING

Herbert S. Johnson, Chicago, Ill.

Application July 10, 1942, Serial No. 450,425

1 Claim. (Cl. 257—8)

While certain features of this invention may be adapted for buildings of various kinds, it is particularly directed to houses and means for heating, cooling and ventilating the same.

It has been suggested or found that humans have a feeling or sensation of cold when in a room, not merely on account of the coolness of the air, but because their bodies tend to radiate heat to cold walls which are good conductors. By heating or slightly warming the walls, the tendency to lose heat will be reduced and humans can then be comfortable at relatively low temperatures of from 50 to 60 degrees. Therefore, by heating the walls, the room temperature may be comfortably kept at a much lower degree, and furthermore, by providing means for heat transference, the rooms may be heated by heat supplied to the walls. Experiments have indicated that when the walls are warm, persons entering a room having a temperature of approximately 60 degrees will feel that the temperature is at least 75 degrees.

In accordance with this invention, I provide a building having means for heating the same, by having all of the heat supplied through the walls, similar means also being provided for cooling the rooms without having any of the air used for heating or cooling, enter the rooms. I also provide means for ventilating rooms with air which is entirely separate from that used for the heating of the rooms. Means are also provided for controlling such air used for ventilating, so that rooms may be entirely closed so that they may be occupied and the persons in the house may be protected against gas raids or other outside contamination of the air.

The objects of this invention are, as indicated, to provide an improved house or building with novel means for heating or cooling the same; to provide new and improved ventilation for a house or other building with means for controlling the same; to provide insulation for certain of the walls or wall members; and to provide such other advantages and desirable features as will appear more fully from the following description.

In the accompanying drawings illustrating one embodiment of my invention,

Fig. 1 is a perspective view;

Fig. 2 is a similar view with the roof and other parts removed to show the construction above the first floor ceiling;

Fig. 3 is a detail showing the positions of the openings or conduits through the ceiling;

Fig. 4 is a perspective view with the section or ceiling shown in Fig. 3 removed;

Fig. 5 is a perspective view of the basement with the first floor removed;

Fig. 6 is a view similar to Fig. 5 showing the basement ceiling removed and illustrating certain portions of the heating, ventilating, and cooling apparatuses;

Fig. 7 is a view of the roof as seen from the lower side, showing the rafters or supports and also portions of the air ducts or passageways;

Fig. 8 is a sectional view taken on the line 3—3 of Fig. 7;

Fig. 9 is a cross-sectional view taken approximately on the line 9—9 of Fig. 12;

Fig. 10 is a cross-sectional view taken substantially on the line 10—10 of Fig. 12;

Fig. 11 is a detail illustrating the air cooling apparatus and connections to the circulating system;

Fig. 12 is a cross-sectional view taken substantially on the line 12—12 of Fig. 9; and

Fig. 13 is a sectional detail taken substantially on the line 13—13 of Fig. 12.

As shown in these drawings, 15 represents generally a building of any suitable kind or construction embodying this invention, it being understood that the drawings are merely illustrative of the same and parts have been shown diagrammatically or omitted for convenience in illustration.

The building as shown is a one story house having a basement 16, first floor 17, attic or garret 18 and roof 19. The house is provided with the usual doors or entrances, stairways, and the like, which, however, are not essential parts of the present invention. The principal lighting, however, is furnished through corner windows 20 which jut out from the building and are made double so that they may be securely sealed.

Fresh air is supplied for ventilating the rooms through a plurality of inlets 21, see Fig. 12, which are placed in any convenient positions below the floor 22 and which have inlet openings 23 preferably provided with screens or filters 24 for removing dust or dirt from the air. The inlets lead to grates 25 or registers in the floor which are provided with any suitable controlling shutters. Fans 26 are positioned in the several inlets for forcing the air into the rooms. This ventilating air passes from the several rooms through outlet openings 27 in the ceiling 28, best shown in Figs. 12 and 13. These openings lead to outlet ducts or passageways 29 which are all connected with a

vertical vent 30 that extends above the roof and is preferably provided with a hood or cover 31. It will be particularly noted that the air for breathing or ventilation is in no way connected with the heating apparatus, and the arrangement is preferably such that the fans may be used for forcing air into any one or all of the rooms as desired.

The heating and cooling system or method of heating and cooling the building forms one of the most important features of this invention. In order to secure the sensation of comfortable temperature in the rooms incident to warming of the walls, as above suggested, I provide means whereby not only the walls but the floors and ceilings of the rooms may be heated or cooled as desired. In order to accomplish this, the walls are made double with inner wall members 32 and outer wall members 33. The inner wall members which enclose the rooms are preferably made as thin as practicable and of suitable material for transferring heat, such as sheet steel or other metal. The inner surfaces of these inner wall members may be painted, enameled or otherwise treated in order to give a desirable finish. The outer wall members 33 are provided with insulation 34 in order to prevent the loss of heat to the outer atmosphere to the fullest possible extent.

The air spaces 35 around the walls of the building provide passageways for the heated or cooled air as will presently be explained. A space 36 is left between the floor 22 and the basement ceiling 37 for the passage of air. The attic or space 18 above the ceiling 28 also provides a passageway for the air. It will be understood that the necessary structural members are provided for supporting the various parts of the building and baffle plates (not shown) may be provided in any of the spaces for deflecting or distributing the air. Any suitable means may be used for heating or cooling the air in the spaces around the rooms of the building. In the construction shown, I provide a hot air furnace 38 which is preferably positioned in the basement 16 and which is provided with an outlet flue or chimney 39. The furnace has an air jacket 40 for receiving the air to be heated which enters through an inlet opening or orifice 41. The air passes out from the jacket or heating chamber 40 through a plurality of ducts 42 which lead to the space 36 under the floor. This space is directly connected with the side passageways 35 which in turn lead to the attic space 18 so that the heated air may pass freely from the furnace to the attic and in so doing will pass around all of the rooms of the building. An air return pipe 43 leads from the attic down to the inlet orifice 41 thus providing for a completely closed circuit for the heated air and none of such air enters any of the rooms. Fans 44 may be provided in the several ducts 42 to force the air upwardly from the furnace and another fan 45 may be provided for the pipe 43 to draw the air from the attic and force it downwardly through the return pipe. The ducts 42 preferably lead to different rooms in the building and the fans and valves 48 provide means whereby any one room may be supplied with hot air without forcing the same around the other rooms. This arrangement whereby the house is divided into sections, as for instance, the four rooms shown in the drawings and means provided for positively circulating the air around one section independently of the other sections is of extreme importance in the successful heating of the house. It is well

understood that if natural draft is depended upon for the circulation of air in a house or building, the results are uncertain and unsatisfactory. The direction of the wind is an important feature to be considered in this respect and oft times it is practically impossible to heat one side of the house even if the other side is overheated. In other words, it is essential to provide means such as I have shown and described in order to confine the circulation of the heated air to one portion of the house and to force such circulation in order to insure the movement of the air through the necessary channels or passageways for heating such section. With my improved construction, it is possible by utilizing the proper fan and opening or closing the proper valves 48, to heat one corner section of the building which may be on the normally cold side or side from which the wind blows and with such portion properly heated, a minimum of heat may be delivered to the other sections and yet provide comfortable temperatures.

If desired, air from the attic may be permitted to pass to the atmosphere through an outlet pipe or vent 46 (Fig. 13) which has a valve 47 for controlling the same.

The rooms may be cooled by substantially the same system as used for heating, the cool air being supplied in place of the hot air. If the basement air is sufficiently cool, it may be permitted to enter the ducts 42 through inlet openings having doors 48 which may also be swung in to act as valves in the ducts, as shown in Fig. 6. The cool air of the basement may be forced through the various passageways around the walls by means of the fans 44 and 45 as heretofore described, or if desired, some or all of the air may be vented to the atmosphere through the vent 46.

If further cooling or air conditioning is desired, a refrigerator or air cooling machine 49 as shown in Fig. 11 may be placed in the basement with its outlet 50 connected with the ducts 42 and its inlet 51 connected with the down pipe 43 whereby the cooled air may be circulated through the system in substantially the same manner as described for the hot air.

From this description, it will be seen that I provide means for warming a building whereby substantially all of the walls as well as the floors and ceilings of the rooms will be heated or cooled in the most scientific and efficient manner to provide comfortable living conditions for the occupants. Furthermore, by having the air heating system entirely independent from the air ventilating system, the heated air may be continuously circulated with but comparatively little loss of heat and without any likelihood of contaminating the air in the rooms.

The air supplied for breathing may be kept fresh and will not be dried out or dehumidified by being heated. The ventilating system may also be closed in the event that the air surrounding the building becomes charged with gas, smoke, dust, or the like, and will thus protect the occupants. By having the refrigerated or cool air circulate around the rooms instead of entering the same, the air in rooms may be kept comfortable without any apparent dampness or clamminess such as frequently encountered in air conditioned buildings.

I have illustrated and described a preferred embodiment of the invention as applied to a house, but it will be evident that changes may be made to adapt the same for other types of houses and

also for other buildings without departing from the scope or spirit of the invention. Therefore I do not wish to be limited to the particular constructions or methods herein shown and described except as specified in the following claim in which I claim:

A building comprising a plurality of sections, a basement, and an attic, the walls of the building being provided substantially throughout with air passageways which are substantially coextensive with the outer walls of the sections, a plurality of air spaces below the floor corresponding to the several sections and constituting

air passageways connected with the air passageways of the side walls, the passageways of the walls also communicating with the attic, means for regulating the temperature of the air, a plurality of ducts from the temperature regulating means leading to the several air spaces below the sections, fans for circulating the air through the respective ducts, a common return pipe leading from the attic to the temperature regulating means and means for controlling the circulation around any of the sections, as desired.

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