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DRYING AND VENTILATING SYSTEM FOR HOUSES, FACTORIES, OR BUILDINGS.

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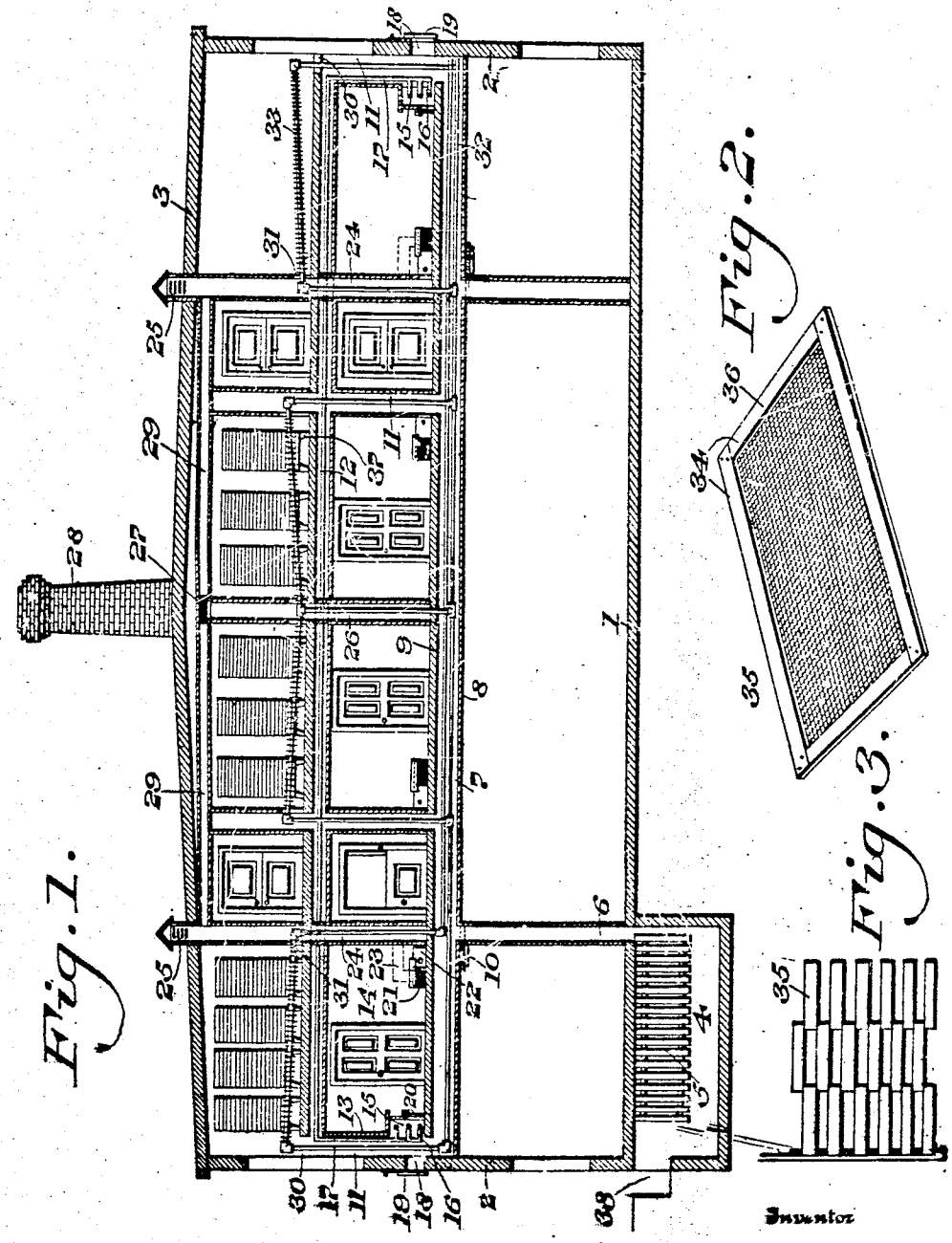


Fig. 1.

Fig. 2.

Fig. 3.

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DRYING AND VENTILATING SYSTEM FOR HOUSES, FACTORIES, OR BUILDINGS.

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To all whom it may concern:

Be it known that I, GOTTFRIED MÜLLER, a subject of the Emperor of Germany, residing in the city and county of Philadelphia, State of Pennsylvania, have invented a new and useful Drying and Ventilating System for Houses, Factories, or Buildings, of which the following is a specification.

My present invention consists of a novel and useful construction of a system for drying and ventilating purposes whereby not only a desired temperature may be maintained in different rooms of a building, but furthermore a constant supply of fresh air either heated, cooled or at its natural temperature may be admitted to any desired room or rooms and the vitiated air in said room or rooms be permitted to freely pass into an exhaust passage open to the atmosphere.

A further object of my invention is to devise a novel and useful system of drying and ventilation, whereby any desired articles of commerce such as noodles, macaroni or the like when stacked therein, may be dried in an efficient and reliable manner in a much shorter time and at a greatly reduced cost than under ordinary conditions.

My invention further consists of a novel construction and arrangement of drying rooms and novel means for permitting air at a desired temperature to pass thereinto and for permitting the vitiated air to pass therefrom.

It further consists of other novel features of construction and correlation of parts, all as will be fully hereinafter set forth.

For the purpose of illustrating my invention, I have shown in the accompanying drawings one form thereof which has been found in practice to give satisfactory and reliable results, although it is to be understood that the various instrumentalities of which my invention consists can be variously arranged and organized and that my invention is not limited to the precise arrangement and organization of these instrumentalities as herein shown.

Figure 1 represents a sectional elevation of a building provided with a system of drying and ventilation embodying my invention. Fig. 2 represents a perspective view of one of the drying frames in detached position. Fig. 3 represents in elevation, a portion of a stack showing the manner in which the drying frames are arranged with respect to each other.

Similar numerals of reference indicate corresponding parts in the figures.

Referring to the drawings. In the preferred embodiment of my invention as illustrated herein, I have shown a building in which the second floor is adapted to be used for living purposes, the upper floor being adapted to be employed for the drying or cooling of any desired article, while the lower floor, I have shown as being of the usual construction, although it will be apparent that the same may be equipped with suitable inlet and outlet passages for the air in a manner similar to that shown in connection with the second and third story of the building.

1 designates the foundation floor, having rising therefrom the walls 2 which support a roof 3, it being understood that my system is adapted to be placed in any buildings now in use and that it is not essential to reconstruct the building in order to adapt the same for use with my invention.

4 designates a chamber preferably below the floor, provided with an inlet passage 38 which communicates with the atmosphere. The chamber 4 has located therein, any suitable heating or cooling system and for the purpose of illustration, I have shown as located in said chamber, a radiator through which hot water, steam or a suitable cooling mixture such as brine can be passed. After the air has passed around the conduits 5, it passes through a passageway or canal 6, which, in the present instance, communicates with a longitudinally extending canal 7 located between the double floors 8 and 9 of the second story, said passage 6 being controlled by means of a suitable gate or closure 10.

11 designates passages extending upwardly from the canal 7 and communicating with a longitudinal canal 12 formed between the double floor of the third story. One of the side walls 13 of the rooms 14 in the second story is deflected inwardly in order to form a chamber 15 in which is located a source of heat 16, from which extends a pipe 17, said pipe passing through the canal 11 and the canal 12, then down the canal 11 on the opposite side of the building and communicating with a similar source of heat or cooling device 16 whereby the air which is admitted through one of the ports 18

when the gate or closure 19 therefor is open may be suitably heated before the same passes through the canals 11, 7 and 12, to the different rooms, it being understood that when the source of heat or cooling device such as 16 is employed that the gate 10 would preferably be actuated to close the passage 6, although it will be apparent that the heating or cooling devices 5 and 16 may be actuated in unison if so desired.

20 designates a gate controlling the admission of fresh air from the chamber 15 into the chamber 14, the vitiated air in said chamber passing through the opening 21 controlled by the gate 22 and thence into the passage 23 which communicates with a canal or passage 24 preferably located on the side of the room opposite to the gate controlled inlet 20. The canal or passage 24 extends through the roof and communicates at 25 with the atmosphere, it being noted that the passage 26 for the vitiated air communicates with the passage 27 leading to the chimney 28 and that the passage 27 communicates by means of passages 29 with the passages from the different rooms for the vitiated air such as 24.

30 designates an opening through the floor of the upper story, which communicates with the passages 11.

31 designates passages in the side walls of the rooms of the upper story communicating with the outlet passages 24 and 26 as may be clearly understood from Fig. 1.

32 designates a series of conduits which pass through the passages 7, 11, 12 and through the openings 30 and 31 of the upper floor whereby the rooms on the upper floor may be used as drying or cooling rooms and whereby any desired temperature may be constantly maintained therein, it being understood that where the pipes pass through the floors they may be insulated in any suitable manner such as is well known in the art and the pipes may be provided with vanes or ribs 33 whereby a greater amount of heat will be given off.

34 designate the side members which form the drying frame 35, said members having united thereto any suitable material 36 such as gauze, cloth or any material through which the air may readily pass, it being understood that the material which is to be dried is spread out on the portion 36 of the drying frame.

The drying frames are supported on a skeleton framework 37, so that the air may readily pass therebeneath, the manner in which the frames are piled up being clearly shown in Fig. 3, and in Fig. 1, I have shown a side elevation viewed from a different direction so that the passageways formed by the stacks of frames may be clearly seen, it being apparent that these frames 35 may be arranged in the drying room in any suitable manner and that, if desired, the entire room may be filled with such frames from the bottom to the top thereof.

The operating and controlling of the system will now be readily apparent. If the system is applied only for ventilation as shown in the second story of the building seen in Fig. 1, the gate 20 is raised and the fresh and heated air is permitted to pass into the room and the gate 22 is opened so that the vitiated air will pass therefrom through the opening 21 into the atmosphere communicating passage 24, it being understood that the heated air rises to the top of the room and the air as it is cooled gradually falls until it passes through the opening 21. Since the systems 5 and 16 are adapted to convey either a heating or cooling medium, it will be apparent that any desired temperature within certain limits may be maintained within the different rooms. When it is desired to employ a room for drying purposes, the air at a desired temperature will pass into the room near one end thereof and the vitiated air will pass therefrom through a controlled opening into an atmosphere communicating passage.

It has been found in practice and by careful experiments that articles such as macaroni, noodles and other food articles may be dried in substantially half the usual time when my system of drying is employed. Furthermore at least double the quantity of material to be dried may be placed in a room under my system, so that the amount of drying space which it is necessary to employ is reduced to a minimum. The quality of the product is of the highest, since the natural sweet taste of the wheat or other article is retained and the liability of a moldy or sour product absolutely prevented.

It has been found in actual practice that there is produced by the employment of my system a saving of 60% of the space necessary in the drying rooms, 60% of the time necessary to dry the product, 30% of coal or equivalent heating material and 50% of the space necessary for the setting up and operation of the machines which produce the articles which are to be dried.

It will be apparent that for heating purposes either the exhaust steam or steam direct from the boiler may be employed and that any desired type of cooling medium may be passed through the pipes.

For clearness of illustration, I have preferred to show the floors as being double or hollow, but it is to be understood that in adapting buildings now in use for my invention, that it is simply essential to have suitable passages or canals for the air and it is to be understood that I do not desire to limit myself to a hollow floor or rooms having hollow walls.

It will now be apparent that I have de-

vised a [illegible] and useful construction of drying and ventilating system which embodies the features of advantage enumerated as desirable in the statement of invention and the above description and while I have, in the present instance, shown and described the preferred embodiment thereof which has been found in practice to give very satisfactory and reliable results, it is to be understood that my invention is susceptible of modification in various particulars without departing from the spirit and scope thereof or sacrificing any of its advantages.

I wish to call special attention to the fact that the vitiated air passes through the canals 24 and 26, which are formed by the hollow walls of the rooms extending preferably the full length thereof, and the outlet for the vitiated air is preferably formed between the double walls on one side of the room and extends the whole length thereof and from the bottom to the top.

It has been found in practice that when my system is employed for drying articles such as noodles, the desired results are not obtained unless the hollow walls for the passages of the vitiated air to the atmosphere are employed, but this is not essential in regard to the inlet passage for the fresh and partially heated air, since one or more inlets may be employed and advantageous results will be obtained.

It is of course to be understood that any desired number of passages leading from a room to the hollow walls may be employed according to the size of the room and the rapidity with which it is desired to have the air circulate. I wish to also call especial attention to the fact that both the inlet and outlet for the air are in proximity to the floors of the rooms, as will be apparent from the drawing. It is further to be noted that it is desirable sometimes in summer when the air is very hot and dry to employ accumulators of any well known or desired type for forcing cool and moist air through the conduits and into the different rooms so that air of any desired temperature or moisture may be employed. The accumulators would preferably be connected with a manually actuated force pump connected with a supply of fresh water so that the fresh air entering the building can be saturated with moisture to a desired extent, and since any desired type of accumulator and force pump may be employed, I have deemed it unnecessary to show and describe the same.

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

1. In a device of the character described, the combination of a building having an air inlet and a plurality of rooms with which said inlet communicates near their floor said rooms having hollow walls forming outlet passages communicating with the atmosphere, and said rooms having outlet ports near their lower ends opening into said hollow walls.

2. In a device of the character described, the combination with a building of an air inlet and a plurality of rooms with which said inlet communicates near their floor, said rooms having hollow walls forming outlet passages communicating with the atmosphere, said rooms having outlet ports near their lower ends opening into said hollow walls, and means for changing the temperature of the incoming air.

3. In a device of the character described the combination with a building having an air inlet, of means for changing the temperature of said air, said building having passages leading from said inlet, and opening through the floor of the rooms near one side thereof, said rooms having hollow walls forming outlet passages communicating with the atmosphere, said rooms having an outlet port near the floor, and means for maintaining a substantially constant temperature in said first named passages.

4. In a device of the character described, the combination with a building having a plurality of floors and controllable fresh air inlets, of longitudinal passages beneath said floors, vertical passages communicating therewith and communicating with each room near the floor thereof, said rooms having hollow walls forming outlet passages which communicate with each room near the floor thereof and also with the atmosphere, and means for controlling said outlet passages.

5. In a device of the character described, the combination with a building having a plurality of floors and controllable air inlets, of longitudinal passages beneath said floors, vertical passages communicating therewith and communicating with each room near the floor thereof, outlet passages leading from each room near the floor thereof communicating with the atmosphere, means for controlling said outlet passages, and conduits extending through said passages and into said rooms adapted to convey a heating or cooling fluid for varying the temperature in said rooms.

6. In a device of the character described, the combination with a building having a controllable fresh air inlet thereinto, provided with a passage leading from said inlet opening into each room near the floor thereof, said rooms having hollow walls, means within said passage for varying the temperature of the air passing therethrough, an outlet from each room near the floor thereof formed by hollow walls between the rooms and communicating with the atmosphere, and a gate for controlling said outlet.

7. In a device of the character described,

the combination with a building having an air inlet, of means for varying the temperature of said air, said building being provided with passages leading from said means and communicating with the rooms near the floor thereof, the rooms having outlet passages on the opposite side to their inlet passage and communicating with an outlet passage formed between double walls on one side of the room extending substantially the whole length thereof and from the bottom to the top thereof and in communication with the atmosphere.

8. In a device of the character described, the combination with a building having a plurality of floors, and an air inlet, of means for varying the temperature of the incoming air, said building having longitudinal air passages beneath the floors communicating with said inlet passage, and opening into the rooms near the floor thereof, said rooms having hollow walls communicating with each room near the floor thereof and also with the atmosphere, means for controlling the entrance of fresh air into the room, and means for controlling the passage of the vitiated air from the room.

9. In a device of the character described the combination with a building having an air inlet passage, and rooms provided with hollow walls, said building having an air passage communicating with said inlet and opening into each of said rooms near the floor thereof, of means for regulating the temperature of the incoming air, said hollow walls of said rooms communicating with each room near the floor thereof and also with the atmosphere, and means for controlling the passage of vitiated air into said hollow walls.

10. In a device of the character described, the combination with a building having a plurality of floors, and rooms having hollow walls, said building being provided with an air inlet communicating with each room near the floor thereof, of means for changing the temperature of the air entering each room, each of said rooms having a discharge outlet near the floor thereof opening into said hollow walls, which latter communicate with the atmosphere, and means for controlling said air inlet.

11. In a device of the character described, the combination with a building having a plurality of floors, and rooms having hollow walls, said building being provided with an air inlet communicating with each room near the floor thereof, of means for changing the temperature of the air entering each room, each room having a discharge outlet near the floor thereof opening into said hollow walls, which latter communicate with the atmosphere, means for controlling said air inlet, and independent means for heating each room.

12. In a device of the character described, the combination with a building having a chimney, a plurality of floors and rooms having hollow walls, of means for changing the temperature of the incoming air, said building being provided with a controllable air inlet communicating with each room near the floor thereof, each of said rooms having a controllable outlet port communicating with the hollow walls, and a conduit leading from said hollow walls to said chimney.

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