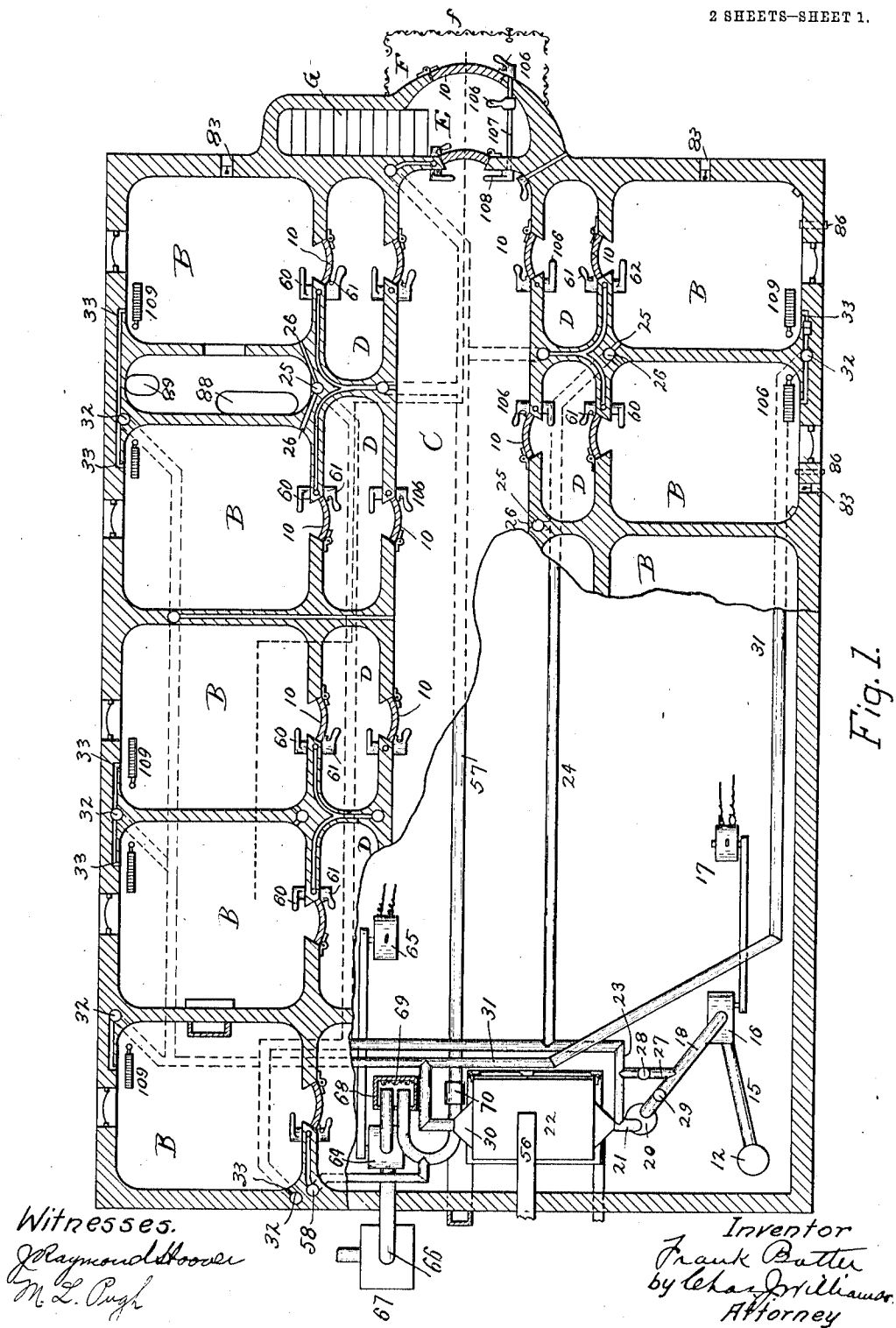




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 PROCESS OF THERAPEUTIC TREATMENT OF AIR IN A SICK ROOM.
 APPLICATION FILED JULY 7, 1908.

1,107,745.

Patented Aug. 18, 1914.

2 SHEETS-SHEET 2.

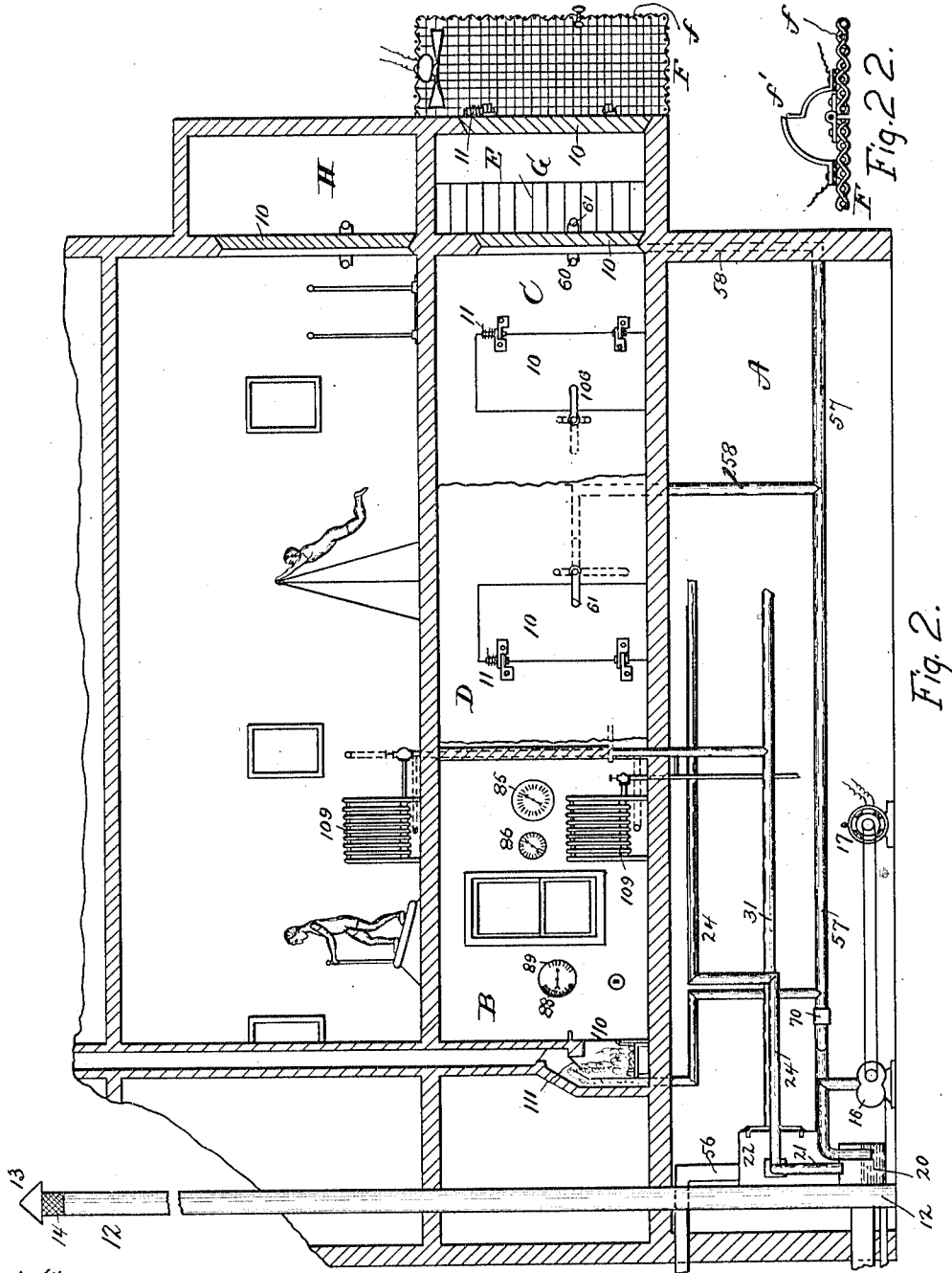


Fig. 2.

Fig. 2.

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FRANK BATTER, OF ST. JOHNS, OREGON.

PROCESS OF THERAPEUTIC TREATMENT OF AIR IN A SICK-ROOM.

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Specification of Letters Patent.

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Application filed July 7, 1908. Serial No. 442,430.

To all whom it may concern:

Be it known that I, FRANK BATTER, of St. Johns, in the county of Multnomah, and in the State of Oregon, have invented a certain
5 new and useful Improvement in Processes of Therapeutic Treatment of Air in a Sick-Room, and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, in which—

10 Figure 1 is a horizontal section of a building constructed in accordance with my invention, showing a portion of the basement and a part of the ground floor; Fig. 2 is a
15 vertical section of said building.

The object of my invention is the provision of conditions which will secure the comfort and health of human beings by the production and maintenance of those conditions of the air or atmosphere by which they
20 are surrounded which are or may be necessary for comfort and the prevention and cure of diseases, and to this end my invention consists in the process substantially as
25 hereinafter specified and claimed.

By my invention the conditions obtaining in any climate or locality may be reproduced in respect to the quality, humidity, density, temperature and purity of the air, so that at
30 his home or in a sanatorium or hospital, a patient may be afforded exactly those conditions of the atmosphere or air which his particular case requires, without the necessity of a journey to the particular locality
35 where the desired conditions exist naturally, and with the advantage, which does not exist under natural conditions, of permanence of the desired conditions, of freedom from the variations which under natural conditions are unavoidable, and with the further
40 advantage that the atmosphere in which the patient lives may be medicated.

My invention is applicable to a single room in an ordinary dwelling house, or a
45 hospital or sanatorium may be specially constructed, and to illustrate my invention, I have selected an embodiment of it in a sanatorium or hospital, the building shown in Figs. 1 and 2 of the drawings being such
50 a sanatorium and having a basement A in which is located certain working parts of the apparatus I employ, and a ground floor divided into numerous rooms B arranged on opposite sides of a central corridor C. From

the corridor a doorway opens into a vestibule D for each room, which doorway is closed by an air-tight door 10, and from the vestibule a doorway opens into its room, which is closed by a similar door 10, and ingress to and egress from the building is had
60 by a vestibule E having an outer doorway closed by an air-tight door 10 and an inner doorway that communicates with the corridor closed by an air-tight door 10. Around the outer door is a screened inclosure F, to
65 exclude insects, and said screened inclosure has a door *f*. Said door *f* carries one member of an electric switch *f'* which controls current to an electric fan supported in the top of the screened inclosure above the outer
70 door 10, the circuit being closed when the screen door *f* is open so as to cause the operation of the fan to drive away any insects finding their way into the inclosure, and open or broken when the screen door *f* is
75 closed. A second story of the building is utilized as a gymnasium, being supplied with suitable apparatus, and such story may be reached by a stairway G that leads from the vestibule E to a vestibule H for the gymna-
80 sium, the doorway leading from the vestibule H to the gymnasium being closed by an air-tight door 10.

The doors 10 have spring hinges 11 which act to swing them normally to a closed position, and to make an air-tight joint, a packing strip is interposed between the edge of the door and the door jamb or frame. The doors and other openings are made air-tight in order to maintain the desired conditions
90 in the rooms uninfluenced by external or outdoor conditions, both from the entrance of air from out of doors and the outward passage of the aeriform contents of the
95 room.

Situated at some convenient point that may communicate with the interior of the building, is a vertical air shaft 12 which as shown in the drawings rises from the floor of the basement through the building and
100 emerges through the roof and is carried to a height to reach air as free as possible from insects, dust, smoke, noxious gases, or other impurities, and below the top of said shaft which is covered by a cap 13 is provided a
105 perforated section 14 forming a screen for air entering the shaft, said shaft being the means for the introduction of air to the

building. From the bottom of the stack a pipe 15 runs to a blower 16 driven by an electric motor 17. From the blower an outlet pipe 18 runs to a washer 20 having an education pipe 21, from which a portion of the washed air is delivered to a drier 22, and another portion by a branch pipe 23 that leads from the pipe 21 to a main 24 for the supply of air to the various rooms or compartments, branch pipes 25 running from the main 24 and leading to outlets 26 to the various rooms and the corridor. A by-pass 27 runs from the blower outlet 18 to the branch 23, and said by-pass is provided with a valve 28, while the outlet pipe 18 is provided with a valve 29 between the by-pass 27 and the washer 20, so that if desired air may be delivered directly from the blower outlet 18 to the main 24 either wholly or in part. A portion of the air passing from the washer 20 when the latter is in use passes directly to the room-supplying main 24, and a portion to the drier 22, and the portion which passes to the drier is delivered therefrom to an education pipe 30 that leads to another supply main 31, from which likewise branches 32 run to the rooms or compartments and the corridor and deliver the air thereto through outlets 33.

To take the aeriform contents of the rooms or compartments therefrom, I provide a main 57 having branches 58 which lead to the various rooms, the communication between a room and a branch being preferably controlled by a hand-operated valve which is attached to the handles 60 and 61, respectively, of the bolt or fastener of the door 10 that controls communication between a room and its vestibule, said handles being respectively inside and outside the room. This valve is a two-way valve and by means of it one may exhaust the air from a room or its vestibule, or the corridor or its vestibule. The exhaust main 57 has connected with it in the basement an exhaust fan 64 driven by an electric motor 65, and from the exhaust fan 64 an education pipe 66 runs to a tank or pit 67. Contiguous to the exhaust fan 64, the exhaust main 57 is bent and enters a box 68 lined with felt 69 or filled with porous material to deaden sound and to form a support or holder for a disinfectant or germicide in some form that will saturate such material, and also for the purpose of deadening or preventing the admission of sound, the exhaust main 57 has contiguous to the box 68 a short section of non-metallic pipe 70. The tank or pit 67 may contain a disinfectant or germicide.

To provide proper ventilation in the event of the stoppage of the exhaust fan or the closing of the exhaust main, I provide an automatically operated valve, which controls an opening leading from each room to the outside thereof.

In each room is placed a barometer 85, for showing the air pressure in each room, and on the dial of said barometer may be designated the barometric pressure of different localities, so that the maintenance of a desired pressure may be conveniently noted, and I also preferably provide each room with a barometer 86, which is connected by a passage 87 with the external air to show the pressure out of doors. I also place in each room a thermometer 88 and hygrometer 89, the two, for convenience, being mounted on the same support, and on the dial of the hygrometer the humidity of various localities may be designated for the more convenient taking account and maintenance of the degree of humidity desired in a given room.

For heating the rooms, radiators 109 connected with a heating apparatus may be employed, and open fireplaces 110 may be used, the smoke outlet or chimney being connected with the exhaust main so that when air is being exhausted from the rooms, the outlet to the outer air through the chimney may be closed, a suitable damper 111 being placed in the chimney for the purpose.

In the operation of my invention in the case of the apparatus illustrated in the drawings, the procedure is as follows: By the operation of the blower 16, air is drawn from a safe altitude through the air stack or shaft 12, and either all, or a portion of the air drawn in, is passed through the washer 20, dependent upon the position of the valves or dampers 28 and 29 in the pipes 18 and 27, and all, or a part of it may be passed first through the drier 22 and thence by main 31 to the rooms or directly to the latter by the main 24. The proportions of air delivered to a particular room without first passing through the drier, to that delivered thereto after passing through the drier, is regulated by the dampers and is according to the degree of humidity desired in that room. Thus if the hygrometer in the room reads 70% and the physician desires to reproduce for the patient a certain climate where the humidity is 30%, the damper controlling the main 24 is closed to cut off the supply of air not first dried and the damper of the main 31 is opened to increase the supply of drier air. The blower 16 is used to produce a pressure only sufficient to overcome the friction of the air through the shaft 12 and to force it through the washer, and not to produce a pressure in the supply mains 24 and 31. The air taken from the stack or shaft and passing through the drier 22 has contact with the tubes or cylinders therein containing an air absorbing material, and enough of the latter is employed to take from the air nearly all the moisture carried

thereby, so that when the air makes its exit from the drier, it will be in a very dry condition. The moisture taken up by the absorbent material is given up in turn by the latter to the heated air which passes vertically through the hollow cylinders or tubes as hereinbefore explained, and thus the absorbent material is maintained in an active state. The lining of burlap or other fabric for the tubes or cylinders while not interfering with the proper action of the apparatus, prevents the small particles of absorbent material from passing through the cylinder wall.

With the drier constructed as I have described, ample provision is made for the extraction of moisture from the air to be treated, and for maintaining the absorbent material in an active state, and any considerable quantity of air is prevented from finding its way to the interior of the tubes or cylinders and being lost by escaping through the flue 56.

By the operation of the exhaust fan 64, air is withdrawn from the various rooms and corridors while fresh or new supplies of air are being delivered thereto, and it will be evident that by simple adjustment of the dampers in a particular room, which control the supply of air thereto, any desired degree of rarefaction of that particular room may be secured, so that the barometric pressure therein may be that which the physician considers advisable in the particular case, accurate noting of the pressure being possible by use of the barometer in the room, and the humidity of a particular room may be any degree desired to suit the particular case, the degree of humidity being possible of ascertainment accurately and quickly by the hygrometer provided in the room, and by means of the heating apparatus and reference to the thermometer provided in a particular room, a desired degree of temperature may be obtained therein; and in addition to the reproduction of these natural conditions which do not obtain in the locality where the building or room is located, it is possible by my invention to charge the atmosphere of a particular room by any desired medicament. The regulation of the temperature of a room while maintaining certain conditions of air pressure and humidity therein, is a matter of special importance in the treatment of certain diseases to which, for example, high temperatures are unfavorable or disastrous, and which make treatment under the natural conditions of air pressure and humidity that are favorable to the disease, have the drawback that such natural conditions are to be found in localities where the temperature is high.

With my invention, the danger to patients from careless or unwise opening of windows

by nurses or attendants for the purpose of ventilation, which exists in hospitals and elsewhere is avoided, so that, for example, a patient on whom an operation has been performed and who may be specially liable to bronchitis or other pulmonary affections due to drafts, is perfectly protected in this regard. His room may be perfectly ventilated and yet without the possibility of any dangerous drafts, the incoming air being spread or diffused along the ceiling of the room, and the outgoing air being taken from near the floor of the room, and the opening for the outlet pipe being if desired protected by an inverted hood or shield.

By the provision of the gymnasium, convalescent patients may exercise under perfectly favorable conditions, and in the gymnasium, for example, the advantages incidental to mountain climbing, due to the rarefied air and the low temperature, may be obtained by exercise in a properly rarefied air of the desired temperature, and the deep breathing which results from exercise, may be utilized by charging the air of the gymnasium with some medicament which will thus be inhaled under most advantageous conditions.

It will thus be seen that the air is taken from a distance above the surface sufficient to insure its purity and coolness, is washed and dried, carried to the rooms without possibility of contamination, rarefied to any desired degree and because of the consequent expansion the temperature is reduced in a natural way to correspond with that of a high altitude and the consequent benefit to certain diseases is attained. The air is impregnated with any desired curative agents, any desired degree of ventilation is attained and the vitiated air is removed without the possibility of communicating with and contaminating other rooms and the exhausted air is disinfected before liberation. Protection is secured against exhausting heat of summer and the detrimental accompaniment of any climate due to storms and the consequent changes of humidity, barometric pressure and temperature. A patient, instead of traveling long distances and encountering many risks may remain at home where he may receive the best of attendance and yet appropriate all the benefits that would accompany any climate.

In view of the fact that the influx and efflux of air from a room is absolutely under control, it is an easy matter to produce and maintain a rarefied condition of the air in a particular room, the aeriform contents of such room being drawn off more rapidly than they enter it, and it is possible to graduate the degree of rarefaction so that a patient may gradually become accustomed to that degree of rarefied atmosphere which his particular case requires. As is well known,

it is a distinct benefit to a patient whose blood has lost some of its vitality or is impoverished, to live or be in a rarefied atmosphere, because under such conditions there
5 is an accumulation of a larger proportion of oxygen by the blood, so that the blood in such a case will contain a larger proportion of hemoglobin and of oxygen than is the case where a patient lives under normal pressure.
10 By my system of vestibules and doors, and the valve-controlled air passages in the doors, ingress and egress to the building and to the rooms is possible under conditions which reduce the danger of contamination
15 or infection from the outside and from room to room to a minimum, and the operation of the inner doors is easy notwithstanding the existence of pressures inside them which

otherwise might subject them to unbalanced pressure.

Having thus described my invention, what I claim is—

The method of controlling the atmosphere for producing beneficial effects upon human beings in an isolated room which consists in 25 supplying air from out doors, passing the air through a washer, drying a portion of the washed air, delivering the dried portion to the room, and delivering air directly from the washer to the room.

In testimony that I claim the foregoing I have hereunto set my hand.

FRANK BATTER.

Witnesses:

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