

July 19, 1932.

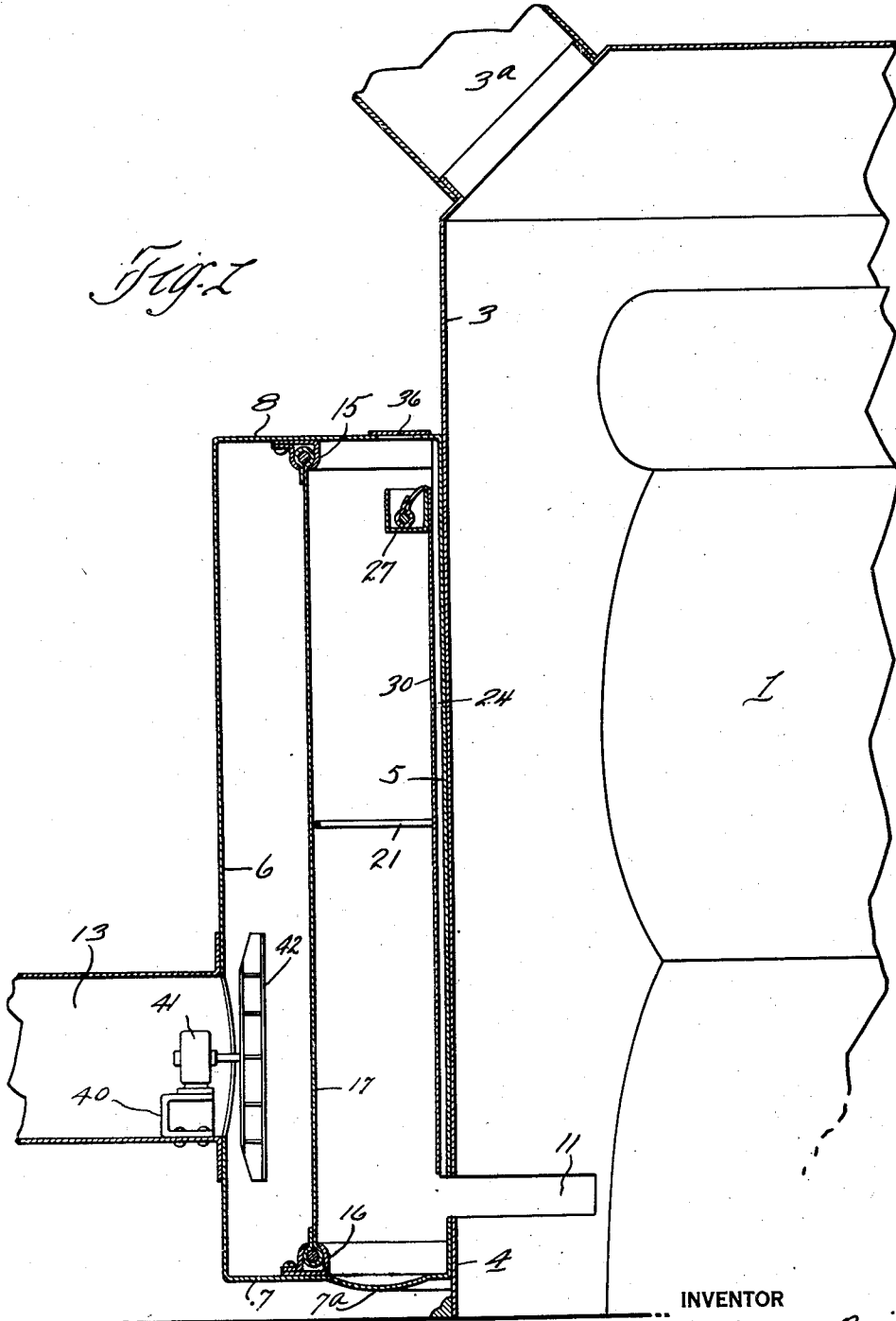
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1,868,278

AIR CONDITIONING DEVICE

Original Filed Jan. 11, 1930 2 Sheets-Sheet 1

Fig. 1



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Fig. 2

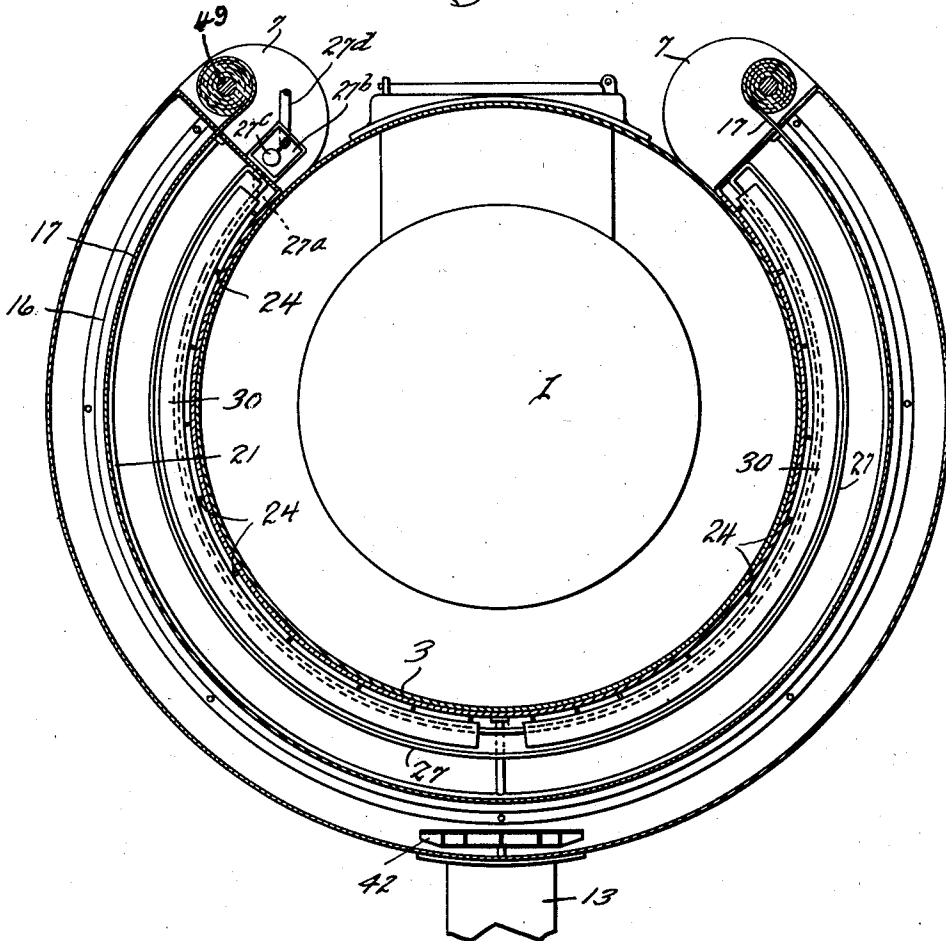
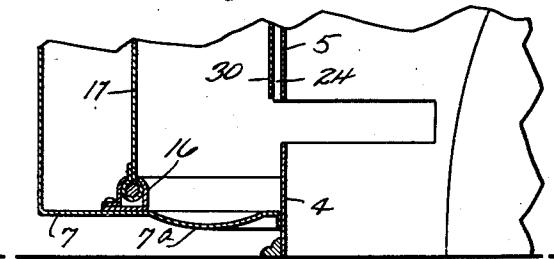


Fig. 3



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AIR CONDITIONING DEVICE

Original application filed January 11, 1930, Serial No. 420,242. Divided and this application filed August 30, 1930. Serial No. 479,028.

This invention relates to air conditioning means adapted to be used in private houses and other buildings such as stores, factories and the like. The principal object of the invention is to overcome the present unhealthful, uncomfortable and unsanitary atmospheric conditions which usually prevail in houses, stores and factories at the present time, and to accomplish this result by the provision of a simple, efficient and inexpensive apparatus, hereinafter described in detail.

I am aware that, prior to my invention, certain devices have been produced for air conditioning, but so far as I am aware there are none which give desirable results and which are at the same time sufficiently simple and efficient to warrant their general installation in places where such devices are desirable.

Ordinary hot air furnaces now in use are efficient in maintaining a comfortable temperature in well built houses, especially when combined with automatic or thermostatically controlled means for governing the rate of fuel consumption.

It is one object of this invention to produce a device which can be used in connection with hot air heating installations already in use.

One of the principal evils which this invention is designed to overcome is that of low humidity which usually obtains in winter, due to the drying effect produced on outside air when it is brought in and heated. It is well known that excessively dry air causes squeaking floors, loosening of furniture, and any number of bodily ills, such as nose and throat irritations due to dehydrated mucous membrane, pulmonary disorders due to sudden changes of humidity inside and outside the building, and predisposition to colds, grippe, influenza and similar infections.

These evils can be in a large measure overcome by the use of properly humidified air, and it is a further object of this invention to provide a device which shall be of such simplicity of construction that it will be feasible for the ordinary householders to

provide properly conditioned air. In addition to providing proper humidity conditions it is also an object of this invention to overcome another important cause of discomfort and disease, namely, unclean or dusty air, which carries irritating dust particles and bacteria and also necessitates constant sweeping and dusting, all of which are largely unnecessary.

Other and more specific objects will become apparent as the description proceeds.

This application is a divisor of application Serial No. 420,242, filed January 11, 1930.

Referring to the accompanying drawings, Fig. 1 is a fragmentary vertical section; Fig. 2 is a section on the line 2—2 of Fig. 1; and Fig. 3 is a fragmentary section corresponding to a portion of Fig. 1 but showing a slightly modified form of the device.

Referring to the drawings, the numeral 1 indicates the cylindrical wall of a firebox of an ordinary hot air furnace. A horizontal partition 2 may constitute the bottom of the firebox, provided with any suitable grates, according to conventional construction. Arranged outside the wall 1 and concentric therewith is the conventional furnace shell 3 between which and the furnace the air to be heated passes. A bottom wall 4 serves to prevent air entering except through the conditioning means. Attached to the wall 3 of the furnace shell by any suitable means is an annular wall 5 which taken in connection with the concentric wall 6 and top and bottom walls 7 and 8, and end walls, constitute what I term a "conditioning chamber". (This chamber may extend a greater or less distance around the furnace as desired). An opening 11 is provided in the wall 3 to admit air from the conditioning chamber into the furnace shell and the wall 5 is slotted above the bottom of the wall 6 to provide an air passage from the chamber into the furnace shell. The upper end of the furnace shell communicates with any suitable pipes 3^a leading to the various rooms to which air is to be furnished. The air pipe 13 communicates with some portion or portions of the

house from which air is to be drawn and conditioned.

It is also within the contemplation of my invention to provide a connection from the air pipe 13 to the outside and to provide the same and the other supply pipes to the pipe 13 with valves so that air may be taken from inside or outside in any desired proportions, thereby being able to take advantage of conditions outside and to admit conveniently a small amount of outside air to avoid the accumulation of carbon dioxide in the house.

Mounted in suitable holding devices 15 and 16 at the top and bottom respectively, is a dust removing means 17, which may consist of a strip of fabric such as cotton flannel, a number of sheets of porous paper or any other suitable dust removing means. The retaining members 15 and 16 are continuous and extend the full length of the annular conditioning chamber. These preferably consist of a strip of sheet metal bent as shown to provide a bulged portion for the reception of the edges of the screen 17. This screen in the preferred form consists of fabric having the edges hemmed and a wire, cord, or equivalent member inserted into the hem to prevent the edge from escaping out of the surrounding means 15 and 16. If the force of air against the member 17 is such as to require it, the screen may be supported by annular shaped wire holding means 21 held in position by suitable supports attached by solder or the like. Attached to the wall 5 are ribs 24 which extend outwardly therefrom at regularly spaced intervals, such as may be found necessary to prevent the humidifying screen 30 from coming into contact with the wall 5. Attached to the wall 5 are suitable brackets which support a trough 27 containing water. The trough 27 may communicate through a suitable pipe 27^a with a float valve chamber 27^b which is supplied by pipe 27^c communicating with the city water supply and controlled by a float 27^c and any suitable valve construction controlled thereby. The fabric 30 which may have a weight attached to the edge thereof dips into the trough 27 and is held in position therein by said weight. The fabric 30 extends over the edge of the trough 27 and hangs in juxtaposition to the ribs 24 which are attached to the wall 5. This fabric will be kept moist by means of capillary attraction and will serve to evaporate a large quantity of moisture into the air by reason of being in close juxtaposition to the screen through which the air must pass. The humidifying screen 30 is held away from the wall 5 by means of the ribs 24 and thus allows the passage of air both through and adjacent thereto, as it passes toward the opening 11. Formed in the bottom wall 7 is a drip trough 7^a which may have a connection with the sewer. Covers 36 are provided for

the introduction of the humidifying fabric 30. A weight may be provided at the bottom of each humidifying fabric 30 to hold the same in proper position.

Mounted on any suitable bracket 40 is a small motor 41 driving a fan 42. This fan is of a size to produce a suitable air pressure against the screen 17 and it has been found in practice that an air pressure of from .15 to .20 inches of water is suitable, producing a passage of air through the screen 17 of approximately 25 cu. ft. per minute per square foot. An important feature of this invention is the reduction to the minimum of the air pressure required, by the use of a large area of screen, and this large area is obtained without employing a device which requires a large amount of space for its installation by using a device made in annular shape to fit closely against the wall of the furnace shell.

It is also an important feature that a large area of humidifying fabric is exposed in close juxtaposition to the screening fabric.

As before stated, the screen means 17 is continuous and held in brackets 15 and 16. Each end of this fabric may extend through the end walls and be received in roll holders provided with central spindles 49 and cranks (not shown) which may be provided with ratchets, if desired, to prevent retrograde movement and may be employed to stretch the screen in position.

In operation the air is drawn by the fan 41 through the pipe 13 from the house or other desired source of supply and passes into the conditioning chamber, through the air cleaning device 17, adjacent the humidifying fabric 30 and through the opening 11 into the furnace shell where it is heated by passing in close contact with the wall 1 of the firebox. It then passes to the various rooms where conditioned air is required. I have found that where the amount of air which comes into the house from the outside is small, after a desirable humidifying area has been established, which may be done by inserting or removing sections of the humidifying means, the humidity will automatically remain in the comfort zone under ordinary operating conditions. As the air tends to become drier, a greater amount of water will be evaporated from the humidifying fabric, and as the humidity increases, a smaller amount of water will be so evaporated. Consequently a point of equilibrium will be reached which under ordinary conditions will remain within the comfort zone.

While I have shown and described certain illustrative embodiments of my invention, I wish it distinctly understood that the same is susceptible of being carried out in various forms within the scope of the appended

claims and that my invention is limited only by said claims.

Having thus described my invention, what I claim is:

- 5 1. A combination heating unit and air conditioning appliance comprising a furnace having a fire box and a substantially annular air heating shell having one or more inlets for air and one or more outlets, a substantially annular air conditioning chamber encircling said heating shell and connected therewith, a substantially annular air filtering fabric disposed within said air conditioning chamber and through which the air to be conditioned must pass, means detachably securing said filtering fabric in place and a fan causing the air to be conditioned to pass therethrough, a sectional humidifying means including separate sections of fabric also disposed within said air conditioning chamber in close proximity to said filtering fabric whereby the air passing through said screen will impinge thereagainst, the humidifying fabric being of substantially the same aggregate size and shape as said filtering fabric, the said air conditioning chamber, filtering fabric and humidifying fabric being of relatively large area so that the air will be delivered therethrough at a relatively low velocity and effectively filtered and humidified.
2. A combination heating unit and air conditioning appliance comprising a furnace having a heating means and a substantially annular air heating shell having one or more inlets for air and one or more outlets, a substantially annular air conditioning chamber encircling said heating shell and connected therewith, a substantially annular air filtering fabric disposed within said air conditioning chamber and through which the air to be conditioned must pass, means detachably securing said filtering fabric in place, and a fan causing the air to be conditioned to pass therethrough, a sectional humidifying means including separate sections of fabric also disposed within said air conditioning chamber in close proximity to said filtering fabric whereby the air passing through said screen will impinge thereagainst, the humidifying fabric being of substantially the same aggregate size and shape as said filtering fabric, the said air conditioning chamber, filtering fabric and humidifying fabric being of relatively large area so that the air will be delivered therethrough at a relatively low velocity and effectively filtered and humidified.
3. An air conditioning appliance including a wall of a heating apparatus, an air chamber adjacent said wall and an air cleaning means in said chamber through which all air conditioned by the device must flow, said cleaning means being of considerable area whereby air will be delivered therethrough at a low

velocity, and said appliance including a humidifying fabric of large area in close juxtaposition to said cleaning means but spaced therefrom a sufficient distance to avoid wetting the latter, and means for causing air to pass through said cleaning means and then along at least one side of said humidifying fabric, said humidifying fabric extending less than entirely across said chamber whereby air need not pass therethrough.

4. An air conditioning appliance including a fire box, an air chamber at least partially surrounding said fire box, and a filter extending completely across said chamber, said filter also partially surrounding said fire box, and said appliance including a humidifying fabric in close juxtaposition to said filter and disposed between the same and said firebox, and means for keeping said fabric moist, said last means including a water receptacle into which an edge of said humidifying fabric dips and means for controlling the height of water in said receptacle.

5. An air conditioning appliance including a fire box, an air chamber at least partially surrounding said fire box, and a filter extending completely across said chamber, said filter also partially surrounding said fire box, and said appliance including a humidifying fabric in close juxtaposition to said filter and disposed between the same and said fire box, and means for keeping said fabric moist, said last means including a water receptacle into which the upper edge of said humidifying fabric dips and means for controlling the height of water in said receptacle.

In testimony whereof, I hereunto affix my signature.

WILLIAM C. DENISON.

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