

Sept. 19, 1933.

F. HANDS

1,927,607

AIR CONDITIONER

Filed Sept. 13, 1930

3 Sheets-Sheet 1

Fig. 1.

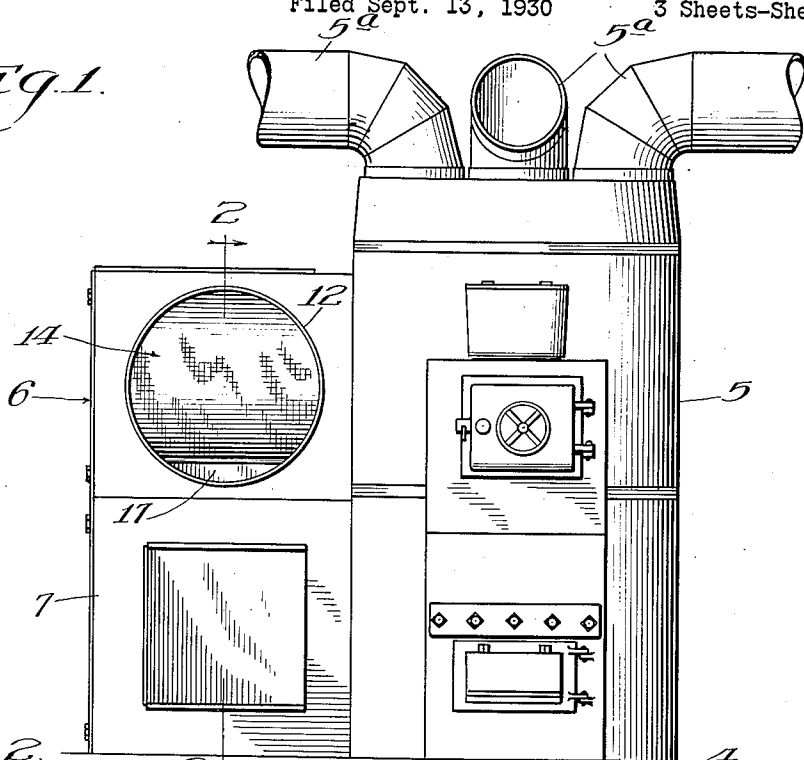
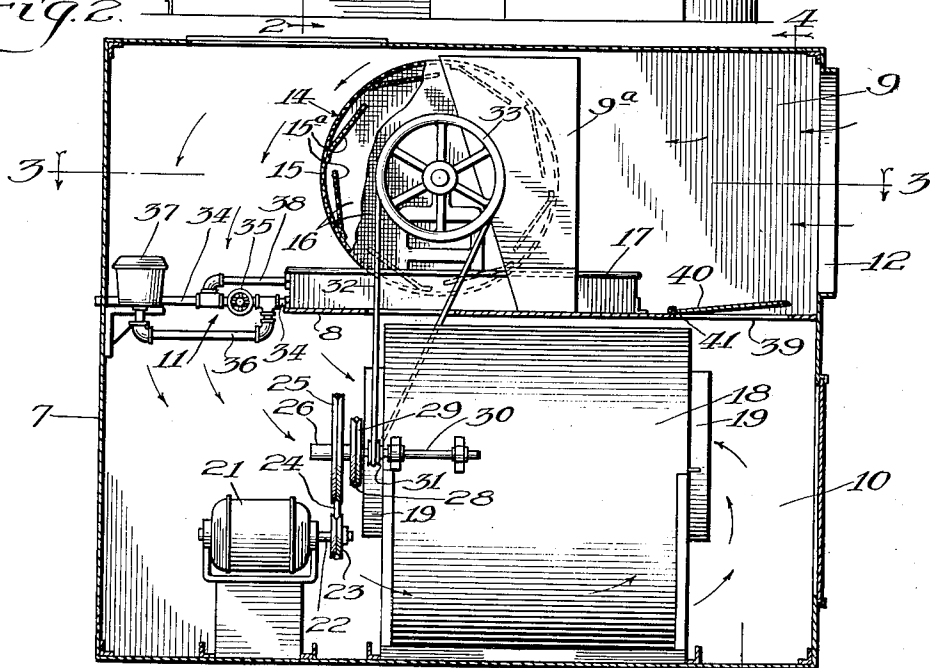


Fig. 2.



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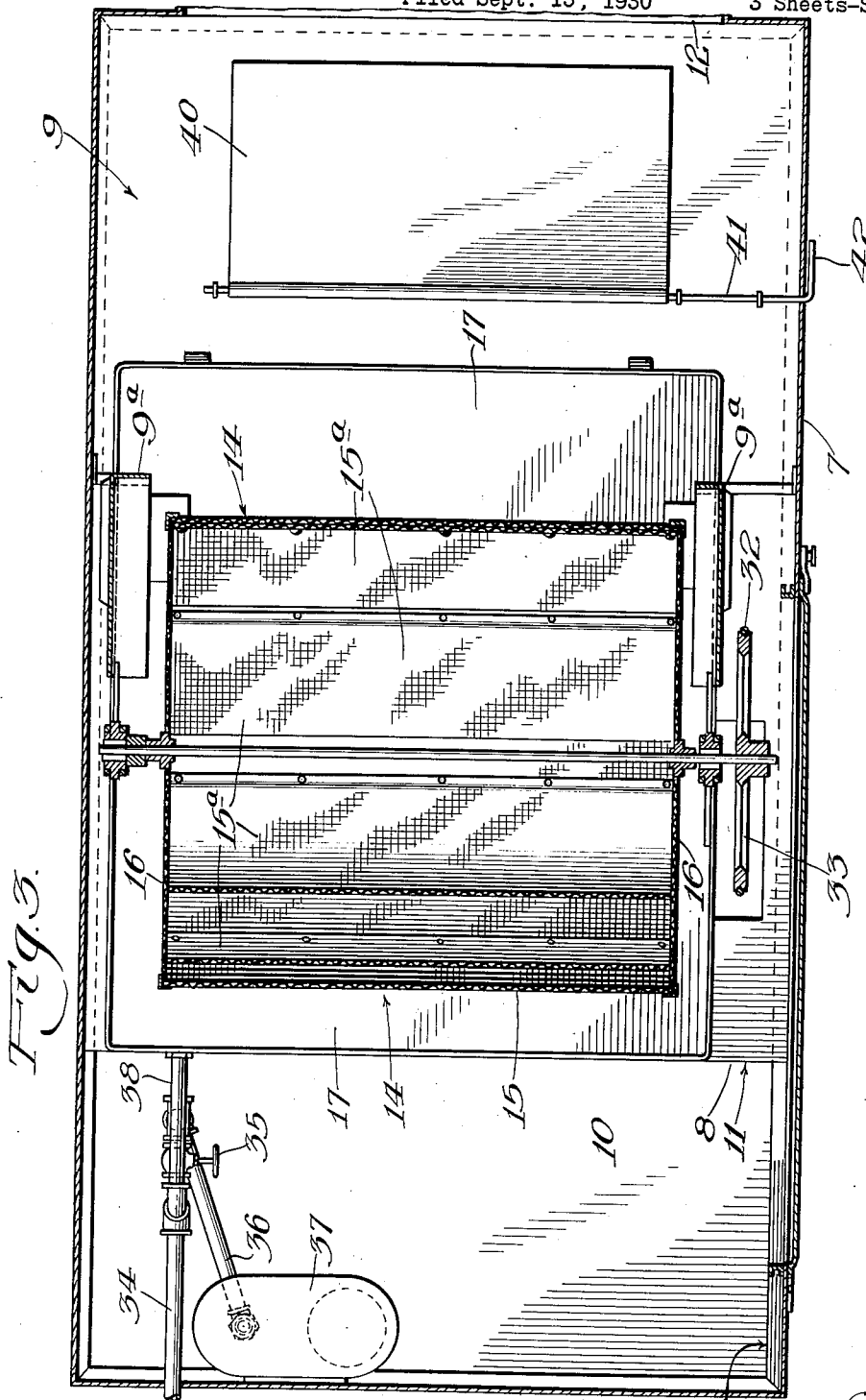
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3 Sheets-Sheet 2



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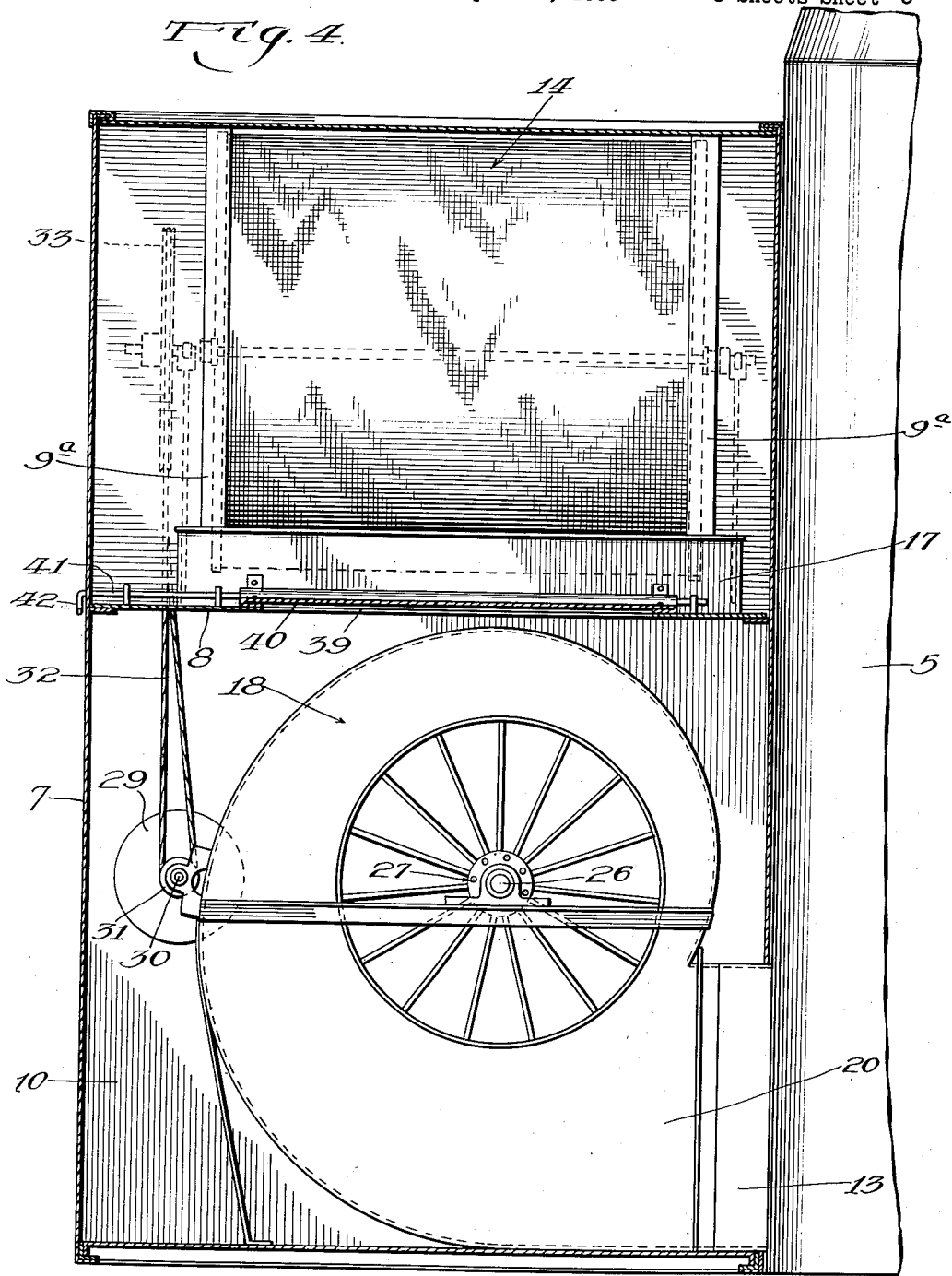
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3 Sheets-Sheet 3

Fig. 4.



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UNITED STATES PATENT OFFICE

1,927,607

AIR CONDITIONER

Fred Hands, Oak Park, Ill.

Application September 13, 1930
Serial No. 481,785

Application September 13, 1930

My invention relates more particularly to apparatus for conditioning air by subjecting it to the filter and shower action of water as for humidifying and cleansing the air or cooling and cleansing it.

One of my objects is to provide a novel, simple, economical and effective construction of apparatus of the character above stated.

Another object is to provide such an apparatus for use in connection with a hot-air furnace and which will operate preferably to effect forcing the circulation of air through the furnace to the register-supplying pipe, or pipes, thereof.

Another object is to provide an apparatus for use in a hot-air furnace structure for circulating moist warm air in cold weather and circulating cool air in warm weather; and other objects as will be manifest from the following description.

Referring to the accompanying drawings:

Figure 1 is a view in front elevation of a hot-air furnace equipped with an air conditioner constructed in accordance with my invention.

Figure 2 is a section taken at the line 2—2 on Fig. 1 and viewed in the direction of the arrows.

Figure 3 is an enlarged plan section taken at the line 3—3 on Fig. 2 and viewed in the direction of the arrows; and

Figure 4, an enlarged section taken at the line 4—4 on Fig. 2 and viewed in the direction of the arrows.

In accordance with the preferred, illustrated, embodiment of my invention, the air conditioner, provided as a unit for connection with a hot-air furnace such as the furnace shown at 5, is represented at 6.

The air conditioner shown comprises a casing 7 as of sheet metal and shown of rectangular form, the casing containing a horizontal partition 8 dividing the space within the casing into upper and lower compartments 9 and 10, respectively, in communication through an opening 11 in the partition 8.

The compartment 9 in the installing of the air conditioner with the furnace 5 would be connected at one end with the source of cold-air-supply for the furnace, as for example to the cold air duct through which the air is supplied to the furnace for heating and return to the rooms of the building, in a furnace of the air-circulating type, such connection being made, as for example at the circular-flange-equipped opening 12 in the end wall of the compartment 9 opposite that adjacent the opening 11.

The compartment 10 at the end thereof adjacent

the opening 12 connects, at an opening 13, with the annular space in the furnace surrounding the fire pot thereof and through which the air ascends for heating to the hot-air-distributing pipes 5^a of the furnace.

Journalled to extend in, and crosswise of, the compartment 9 between its inlet 12 and outlet 11, is a drum 14 the cylindrical side wall 15 and the end walls 16 of which are perforated, these walls being preferably made of wire mesh the openings between the strands of the wires of the mesh forming perforations. The mesh forming the end walls 16 is preferably about one-fourth inch and the mesh of the side wall 15 about one-half inch.

The drum shown is provided about the inner surface of its side wall 15 with a circular series of flange-members 15^a extending substantially the full length of the wall 15 and each connected at one edge with the wall 15 and inclining at its free edge away from the wall 15 as shown, these flange-members 15^a being of perforated form as for example by making them of wire mesh, about one-fourth inch mesh being preferred.

In the operation of the apparatus to subject air flowing through the compartment 9, as by the means hereinafter described, to the action of water on the drum, water is supplied thereto preferably from a bath thereof located in a pan 17 supported on the partition 8 and into which the drum partially extends as shown, means, hereinafter described, being provided for continuously rotating the drum at a relatively slow speed for carrying water up into the path of the air flowing through the compartment 9, for impingement by the air.

The drum not only carries up water on its side and end-walls, the water at many of the openings in the mesh of which these walls are formed forming a film spanning the openings, but by reason of the provision of the flange-members 15^a, carries up an additional supply of water which the air engages in passing through the openings in the members 15^a, the excess water flowing off the free edges of the members 15^a and producing a showering of water in the drum which also is contacted by the air.

The compartment 9 also contains a framework 9^a shown as of sheet metal located between the axis of the drum 14 and the inlet 12 and serving to confine the air flowing in the compartment 9 for passage through the walls of the drum.

Located in the compartment 10 is a blower 18 shown as of the centrifugal type its inlets 19, at opposite sides of the blower, communicating with

the end of the compartment 10 in communication with the opening 11 and its outlet 20 communicating with the outlet 13 of this compartment, the blower 18 operating to suck air from the cold air duct into compartment 9, thence through the perforated walls of the drum 14, opening 11 in partition 8 and into the blower 18, and to force the air, subjected to the humidifying and cleansing action of the water carried up by the drum, into the heating space in the furnace and thence to and through the distributing pipes 5* to the rooms of the building.

The blower 18 and drum 14 are shown as operated by a single power device in the form of an electric motor 21 mounted in the compartment 10. The armature shaft 22 of the motor is provided with a pulley 23 which connects, by an endless belt 24, with a pulley 25 on the shaft 26 of the rotor 27 of the blower 18. The shaft 26 is also provided with a relatively small pulley (not shown) connected by an endless belt 28 with a pulley 29 on a counter shaft 30 journaled on the blower 18, the shaft 30 also being provided with a relatively small pulley 31 connected by an endless belt 32 with a pulley 33 mounted on the drum concentrically with its axis. The motor 21 thus simultaneously operates the blower and the drum rotating the former at the relatively high speed desired and the drum at relatively low speed.

It will be understood from the foregoing that the air drawn through the walls of the drum 14 and through the flange-members 15* and the shower of water produced in the drum as stated is subjected to the action of the water for humidifying and cleansing the air, and that by reason thereof the apparatus is caused to function in a highly efficient manner to humidify and cleanse the air, the particles removed from the air by the water gravitating into the pan 17 from which they may be removed in any desirable way.

The air conditioner is preferably provided with means for maintaining a predetermined depth of bath in the pan 17 at all times, these means in the construction shown comprising a pipe 34 opening into the bottom of the pan 17 and provided with a shut-off valve 35 between which and the tank a water supply pipe 36 is connected, the pipe 36 opening into a float-valve controlling device represented at 37 and which may be of any suitable construction and in communication with a water supply pipe as for example an ordinary water service pipe, the valve mechanism 37 oper-

ating to control the level of the water in the pan 17. An overflow pipe 38 opens into the upper portion of the pan 17 and connects with the pipe 34 beyond the valve 35 to prevent accidental overflow of the water from the pan 17.

In the normal operation of the apparatus the valve 35 would be closed, and opened only when it is desired to drain the pan 17, the service pipe leading to the valve mechanism 37 containing a shut-off valve to close the supply of water to the pipe 36 when it is desired that the pan be drained.

The apparatus shown serves to effect the desired circulation of air through the rooms to be heated or cooled, as the case may be. In the use of the apparatus with a hot air furnace during cold weather, the air for circulation through the rooms, is supplied to the furnace in humidified and cleansed condition and when used with the furnace in cold condition in the summer time serves to distribute through the pipes 5* of the furnace cooled and cleansed air.

By preference the partition 8 contains an opening 39 forward of the drum 14 and controlled by a damper 40 hinged by a rod 41 accessible for operation outside of the casing, at a crank 42 thereon. This valve-controlled opening 39 is provided for controllably diverting more or less of the air as, and if, desired from passage through the drum 14 and thus directly into the compartment 10.

While I have illustrated and described a particular embodiment of my invention I do not wish to be understood as intending to limit it thereto as the same may be variously modified and altered without departing from the spirit of my invention.

What I claim as new, and desire to secure by Letters Patent, is:

An air-conditioner comprising a chamber having an inlet for the air to be operated on, a chamber below said first-named chamber in communication therewith and having an outlet for the conditioned air, means in said first-named chamber for treating the air to the action of water, a blower in said lower chamber for producing air flow therein, said first-named chamber containing an opening in front of said means and in communication with said second chamber, and means for controlling said last-named opening.

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