July 22, 1941. C. A. BOLCOM 2,250,352

AIR CONDITIONING DEVICE

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Fig. 1.

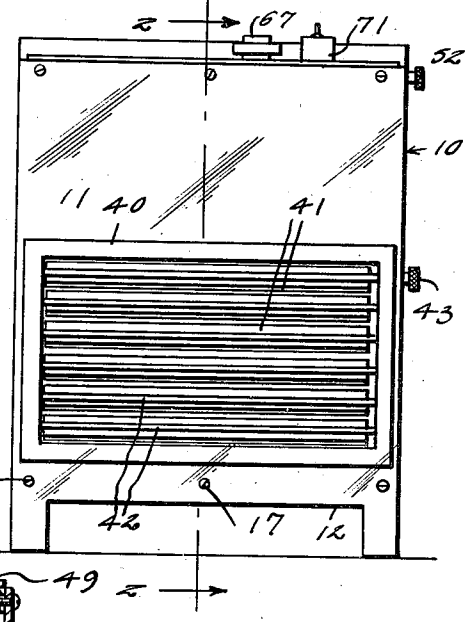


Fig. 2.

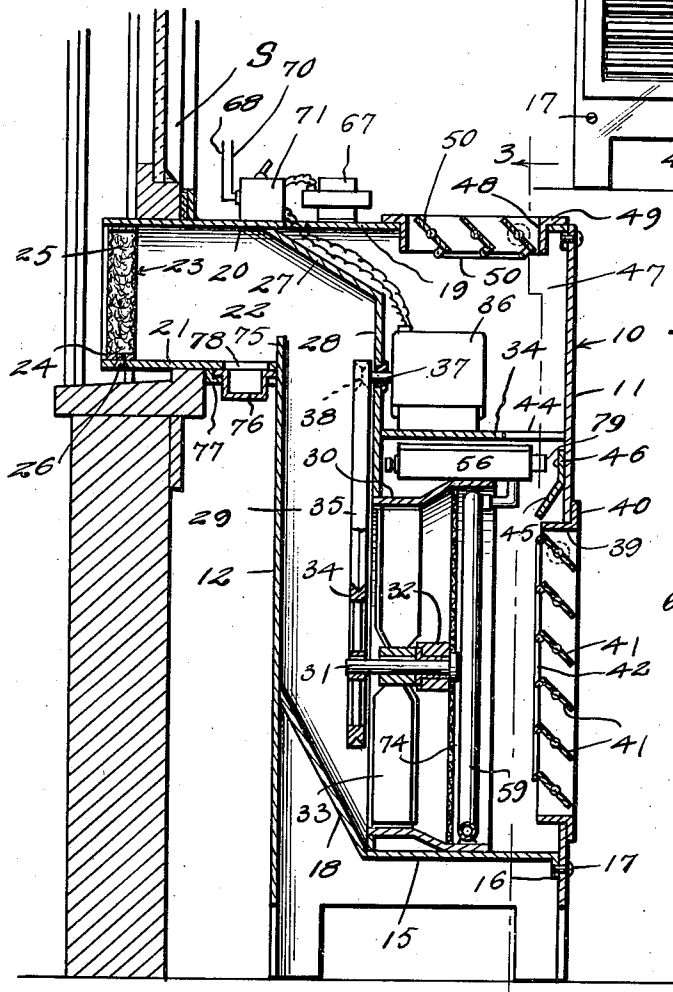
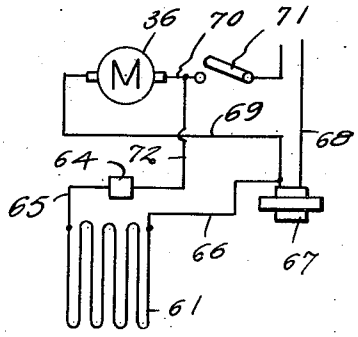


Fig. 6.



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Fig. 3.

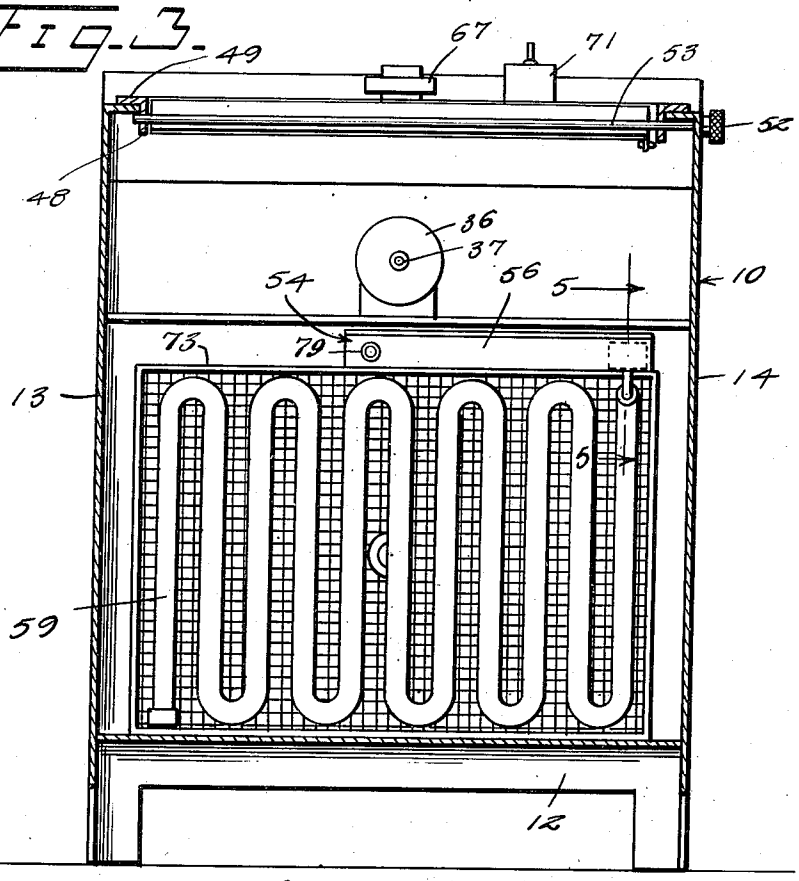


Fig. 4.

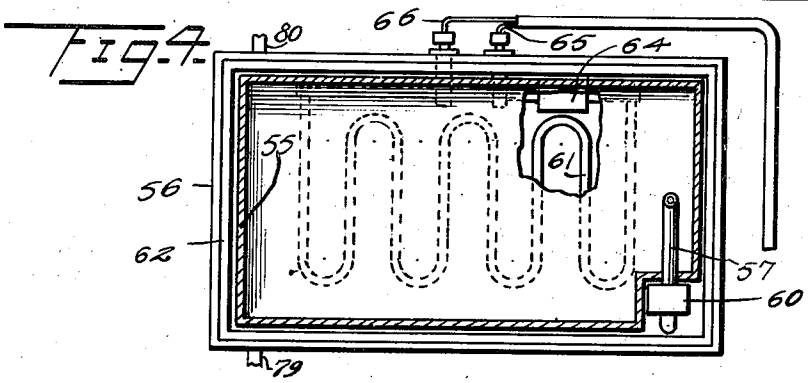
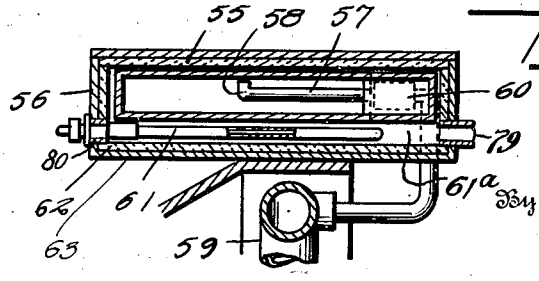


Fig. 5.



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Patented July 22, 1941 2,250,352

UNITED STATES PATENT OFFICE

2,250,352

AIR CONDITIONING DEVICE

Clarence A. Bolcom, Ionia, Mich.

Application August 22, 1939, Serial No. 291,432

4 Claims. (Cl. 98—39)

This invention relates to air conditioning devices and more particularly to a device of this kind which is of a local character for conditioning the air in a room or series of rooms on the same floor.

An object of this invention is to provide an air conditioning of this kind including a self-contained cooling means and means for taking the air from the exterior of the building and discharging the air through a cooling device into the room.

Another object of this invention is to provide an air conditioning means of this type wherein the cooling portion thereof is constructed after the manner embodied in my co-pending application for a Refrigerator, Serial No. 279,192, filed June 14, 1939.

A further object of this invention is to provide an air conditioning means of this type including means whereby the cooled air may be discharged upwardly into the room or in a horizontal direction.

A still further object of this invention is to provide in a device of this kind a thermostat connected to the motor for driving the fan and the cooling unit so that a predetermined temperature may be maintained within the room.

Embodying the foregoing aims and to others which may hereinafter appear, the invention consists of the novel construction, combination and arrangement of parts as will be more specifically described and illustrated in the accompanying drawings, wherein is shown an embodiment of the invention, but it is to be understood that changes, variations and modifications may be resorted to which fall within the scope of the invention as claimed.

In the drawings—

Figure 1 is a detailed front elevation of an air conditioning device constructed according to an embodiment of this invention,

Figure 2 is a sectional view taken on the line 2—2 of Figure 1 and showing the device in operative position relative to the outer wall of a building,

Figure 3 is a sectional view taken on the line 3—3 of Figure 2,

Figure 4 is a horizontal section partly broken away of the generator absorber forming part of the cooling unit,

Figure 5 is a sectional view taken on the line 5—5 of Figure 3, and

Figure 6 is a diagrammatic view of the electric circuits embodied in this invention.

Referring to the drawings the numeral 10 designates generally a jacket or outer casing including a front wall 11, a rear wall 12 and end walls 13 and 14. An inner bottom wall 15 is provided with a depending forward flange 16 which is secured as by fastening means 17 to the inner side of the front wall 11. The rear edge of the bottom wall 15 is provided with an upward extension 18 forming a part of an air duct as will be hereinafter described. A top wall 19 is secured to the upper edges of the front, rear and end walls of the casing or jacket and the top wall 19 is provided with a rearwardly extending part 20 formed integral therewith which extends rearwardly beyond the rear wall 12. An upper wall 21 is secured to the rear wall 12 adjacent the upper end thereof and is disposed in substantially parallel relation with the extension 20 and the top wall 19.

The extension 20 and the upper wall 21 form an intake duct 22 which as shown in Figure 2 is adapted to extend through a window opening and the sash S of the window is adapted to rest on top of the top wall extension 20. By means of the rearwardly extending intake duct 22 the incoming air is adapted to be taken into the housing or jacket 10 from the outside of the building.

A filtering device 23 is disposed across the rear end of the intake duct 22 so as to filter the incoming air. This filtering device may be constructed in the form of a rectangular frame 24 provided with vertically disposed filter elements 25 and the frame 24 may be removably held in the intake duct 20 by removable fastening devices 26. A downwardly inclined wall 27 is disposed in the casing 10 inwardly of the filter member 23 and an inner vertical wall 28 is connected at its upper end to the inclined wall 27. The walls 27 and 28 coact with the rear wall 12 in forming a vertical intake duct 29 communicating with the duct 22. A fan casing 30 is disposed within the housing 10 and a shaft 31 is journaled in a supporting means 32 carried by the casing 30. A blade structure 33 is secured to the shaft 31 and the blade structure 33 is adapted to draw air downwardly through the duct 29. A driven pulley 34 is secured to the shaft 31 and a driving belt 35 is engaged about the driven pulley 34. A motor 36 is mounted on an inner upper wall 37 secured between the upper wall 19 and the inner wall 28 above the fan housing 30. A driving shaft 37 forms part of the motor 36 and is provided with a driving pulley 38 about which the belt 35 is trained. The belt 35 and the pulleys 34 and 38 are disposed within the intake duct 29.

The housing 10 in the forward wall 11 thereof

is provided with a rectangular frame 39 having a flange 40 disposed on the outer side of the front wall 11. The frame 39 is provided with a plurality of louvers 41 which are connected together by a connecting link 42 so that all of the louvers 41 will operate in unison. An adjusting knob 43 is connected to the uppermost of the louvers 41 so that these louvers 41 may be adjusted to the desired angle in order to direct the air in a horizontal direction from the lower portion of the housing 10. The louvers 41 and the frame 39 are positioned in front of the fan housing 30.

The inner upper wall 37 is provided with an opening 44 and a baffle 45 provided with a flange 46 is secured to the inner side of the front wall 11 below the inner horizontal wall 37 so that air from the fan 33 may be directed upwardly through the opening 44 into an upper outlet chamber 47 provided in the housing or jacket 10. A frame member 48 having a flange 49 is mounted in the top wall 19 and is provided with a plurality of louvers 50 connected together by a link 51. An operating knob 52 is connected to a louver shaft 53 so that all of the louvers 50 may be operated in unison.

A cooling unit generally designated as 54 is disposed within the casing 10 and comprises a generator absorber 55 mounted in an insulated outer housing 56. The absorber 55 has a pipe 57 disposed therein which is provided with an upwardly directed open inner end 58. The pipe 57 is extended exteriorly of the casing 55 and is connected to a coil 59 which is disposed in front of the fan 33 on the discharge side thereof. This coil 59 comprises a condenser-evaporator and if desired a de-hydrating means 60 may be interposed in the pipe 57 between the coil 59 and the casing 55. The operation of the cooling unit herein disclosed is similar to the operation of the cooling structure embodied in patent No. 2,068,398.

The cooling unit 54 is adapted to have ammonia or other suitable refrigerant disposed therein and a heating element 61 is disposed in the casing 56 below the generator absorber 55. The casing 56 is provided with a heat insulating means 62 extending about the generator absorber 55 and positioned between the heating element 61 and the lower wall 63 of the housing 56. In order to provide means for dissipating the heat in the chamber 61a within which the heating element 61 is positioned I have provided an air intake 79 and an air outlet 80 which extends through the outer casing 56 and the insulation 62. The heating element 61 is an electric heating element and a thermostat 64 is connected by means of a wire 65 to one side of the heating element 61. The thermostat 64 is adapted to be positioned within the housing 56 so as to control the temperature of the interior of the housing 56. The thermostat 64 is so constructed that it will normally close the electric circuit to the heating element 61, but when the temperature rises to a predetermined degree the thermostat 64 is adapted to break the electric circuit.

The other side of the heating element 61 is connected by a wire 66 to a second thermostat 67 which is positioned on the top wall 19 of the casing 11. This thermostat 67 is adapted to maintain a predetermined temperature within the room and the other side of the thermostat 67 is connected by a wire 68 to a source of electric current supply. The motor 36 is connected by a wire 69 to one side of the thermostat 67, being preferably connected to the wire 66 and the other side of the motor 36 is connected by a wire 70 to the other side of the source of electric current supply. A manually operable switch 71 is interposed in the wire 70. The thermostat 64 is connected by a wire 72 to the wire 70 so that opening or closing of the switch 71 will control the operation of the entire structure.

The coil 59 is positioned in a flared discharge duct 73 which is formed as an extension of the fan housing 30 and preferably a diffusing screen 74 is interposed between the coil 59 and the fan 33 so as to diffuse the air being forced through the spaces formed between the coil 59. In this manner the air will be more thoroughly cooled in its passage through the coil 59.

The intake duct 22 at its inner end is provided with an upwardly projecting baffle 75 which may be formed with the rear wall 12 so as to prevent water being drawn through the duct 22. A pan or tray 76 is disposed below the bottom wall 21 of the duct 22 and is supported by guide means 77. The guide means 77 permit the pan 76 to be pulled laterally of the duct 22 so as to empty the pan or tray 76. The bottom wall 21 is provided with an opening 78 communicating with the pan or tray 76 so that the water deflected by the baffle 75 will flow downwardly into the pan or tray 76.

In the use and operation of this unit the casing 10 is adapted to be positioned with the intake duct 22 projecting through a window opening so that the incoming air will be drawn from the outside of the building. The switch 71 is closed so as to complete the circuit to the motor 36 and the circuit to the heater 61. The heater 61 will generate gas in the absorber 55 which will be forced through the pipe 57 into the coil 59. The gas in the coil 59 will then be passed through the pipe 57 into the generator absorber 55 and this cycle will be continued so that the coil 59 will be maintained in a cooled condition. The louvers 41 may be opened if it is desired to discharge the cold air in the lower portion of the room and at the same time the louvers 50 may also be opened so as to discharge cold air vertically and upwardly into the room. It will be understood that the desired series of louvers may be either opened or closed depending on where it is desired to have the cold air discharged.

This air conditioning device may be constructed in any desired size depending on the size of the room or rooms which it is desired to cool. With a construction of this kind cooled filtered air is discharged into the room or enclosure and any desired temperature may be maintained within the room or enclosure. An air conditioning device constructed according to this invention may be constructed at a relatively small cost and may be operated economically and due to the small amount of moving parts the device will not readily get out of order.

What I claim is:

1. An air conditioner comprising an outer jacket, an air duct in said jacket, said jacket having an air outlet through a wall thereof forwardly of said duct, an intake extension carried by said duct extending rearwardly of said jacket, a filter in said extension, a fan intersecting said duct, a diffusing screen in said duct forwardly of said fan, a baffle at the inner end of said intake extension and projecting upwardly thereinto, said extension having a lower opening rearwardly of said baffle, a moisture

receiver below said opening, and means removably supporting said receiver from said extension.

2. An air conditioner comprising an outer jacket formed of front, rear, end, top and bottom walls, the rear edge of said bottom wall terminating forwardly of said rear wall, an upwardly inclined lower wall secured to the rear edge of said bottom wall and said rear wall, an inner vertical wall spaced forwardly of said rear wall and terminating above said bottom wall and forming an air duct between said rear wall and said inner wall, a fan housing secured to the lower edge of said inner wall and said bottom wall, a forwardly flared discharge member carried by said housing, a fan in said housing, said jacket having an outlet opening forwardly of said discharge member, operating means for said fan, and a difusing means in said discharge member forwardly of said fan.

3. An air conditioner comprising an outer jacket formed of front, rear end, top and bottom walls, the rear edge of said bottom wall terminating forwardly of said rear wall, an upwardly inclined lower wall secured to the rear edge of said bottom wall and said rear wall, an inner vertical wall spaced forwardly of said rear wall and terminating above said bottom wall and forming an air duct between said rear wall and said inner wall, a fan housing secured to the lower edge of said inner wall and said bottom wall, a forwardly flared discharge member carried by said housing, a fan in said housing, said jacket having an outlet opening forwardly of said discharge member, operating means for said fan, a diffusing means in said discharge member forwardly of said fan, an intake extension carried by said jacket extending rearwardly thereof and communicating with said duct, a filter in said extension, and means carried by said extension for collecting the moisture in said extension.

4. An air conditioner comprising an outer jacket formed of front, rear end, top and bottom walls, the rear edge of said bottom wall terminating forwardly of said rear wall, an upwardly inclined lower wall secured to the rear edge of said bottom wall and said rear wall, an inner vertical wall spaced forwardly of said rear wall and terminating above said bottom wall and forming an air duct between said rear wall and said inner wall, a fan housing secured to the lower edge of said inner wall and said bottom wall, a forwardly flared discharge member carried by said housing, a fan in said housing, said jacket having an outlet opening forwardly of said discharge member, operating means for said fan, a diffusing means in said discharge member forwardly of said fan, an intake extension carried by said jacket extending rearwardly thereof and communicating with said duct, a filter in said extension, means carried by said extension for collecting the moisture in said extension, an intermediate horizontal wall in said jacket above said fan housing and said discharge member and provided with an opening communicating with the forward end of said discharge member, said jacket also having a second outlet opening in the top wall thereof whereby air from said discharge member may be directed upwardly of said jacket.

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