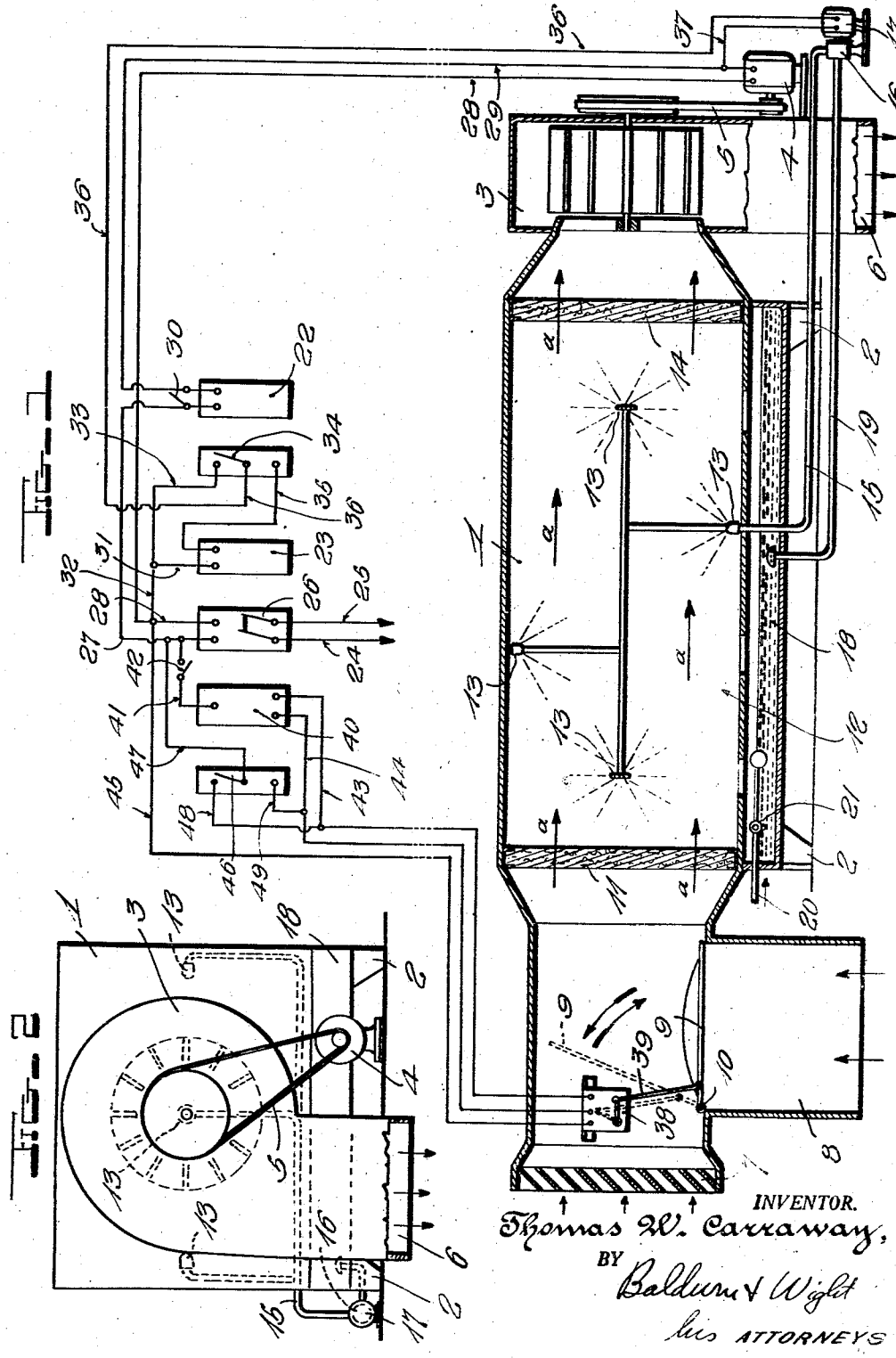
Feb. 29, 1944. T. W. CARRAWAY 2,342,841

AIR CONDITIONING OR COOLING SYSTEM

Filed March 31, 1941 6 Sheets-Sheet 1

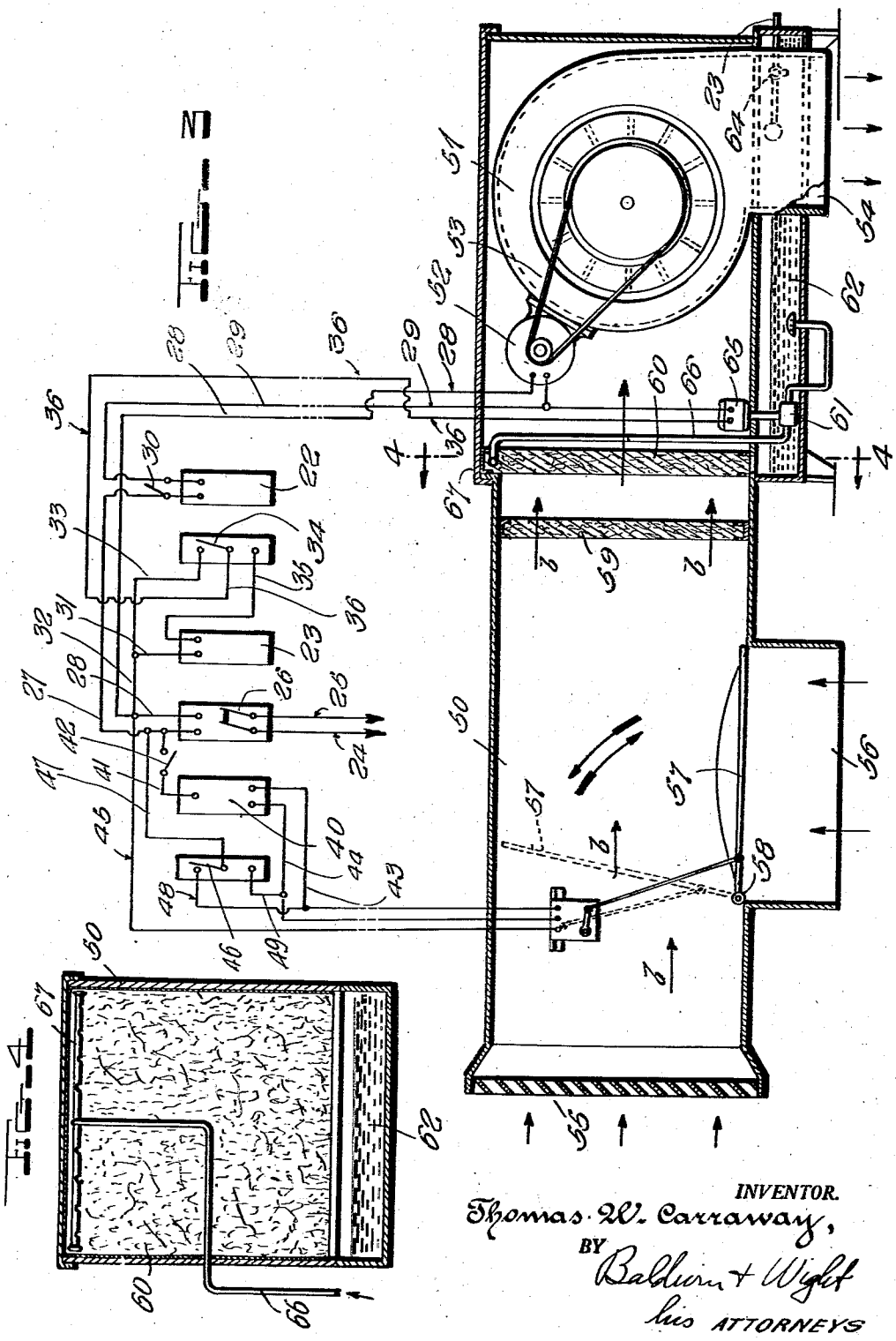


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AIR CONDITIONING OR COOLING SYSTEM

Filed March 31, 1941 6 Sheets-Sheet 2

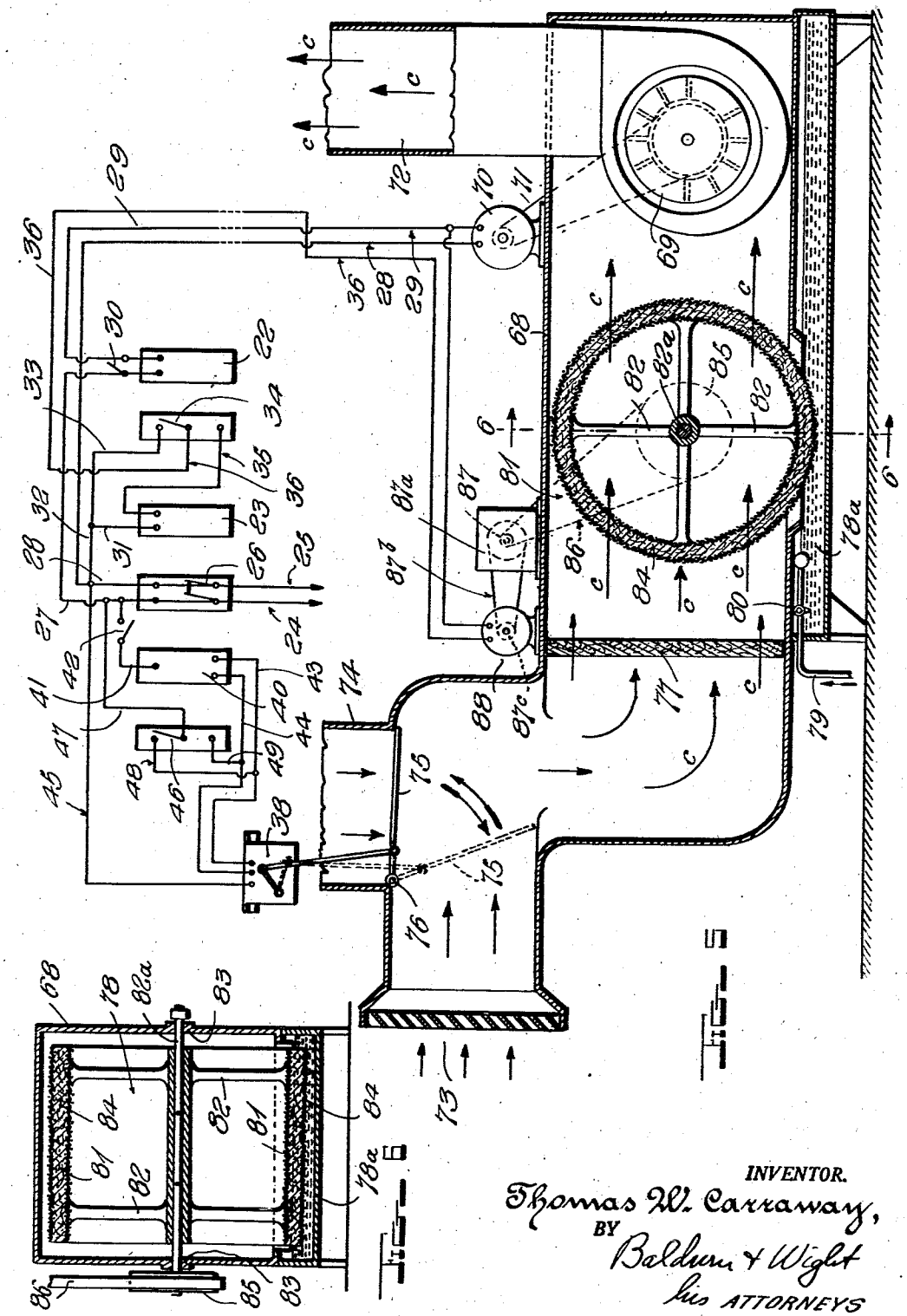


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AIR CONDITIONING OR COOLING SYSTEM

Filed March 31, 1941 6 Sheets-Sheet 3



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AIR CONDITIONING OR COOLING SYSTEM

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FIG. 7

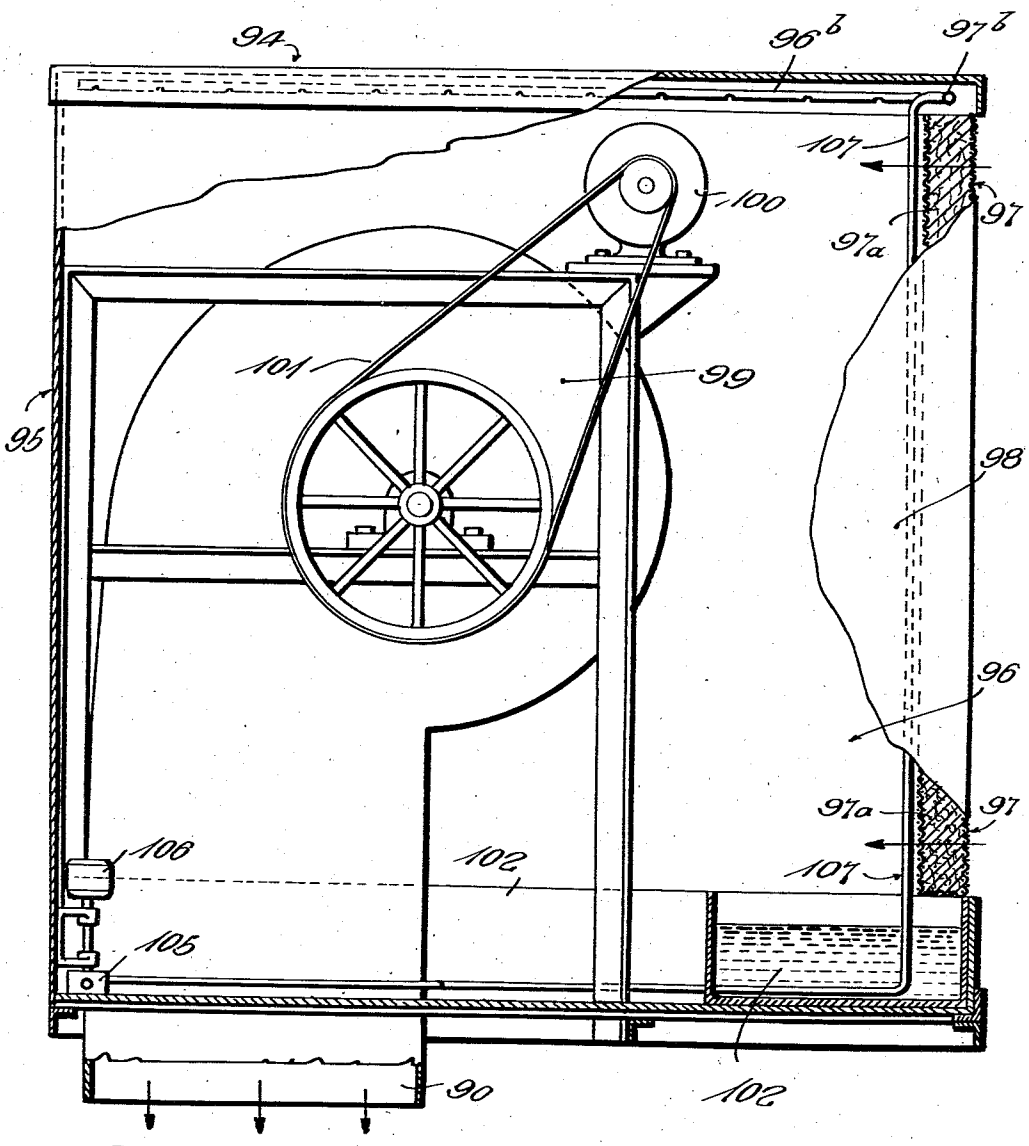
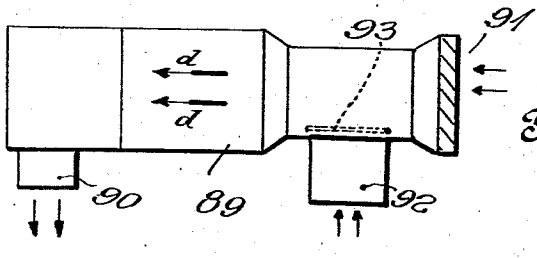


FIG. 7a

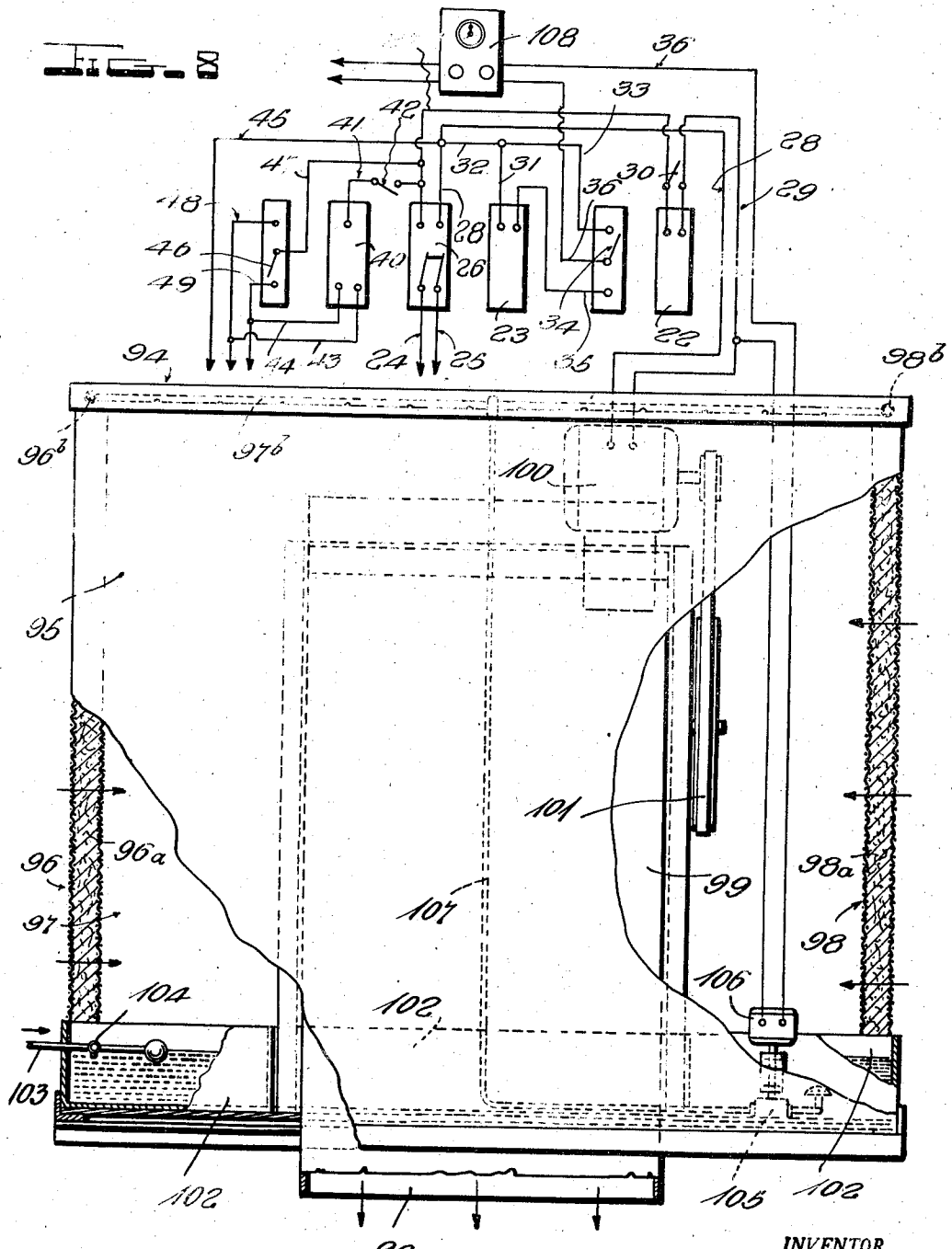


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AIR CONDITIONING OR COOLING SYSTEM

Filed March 31, 1941 6 Sheets-Sheet 5

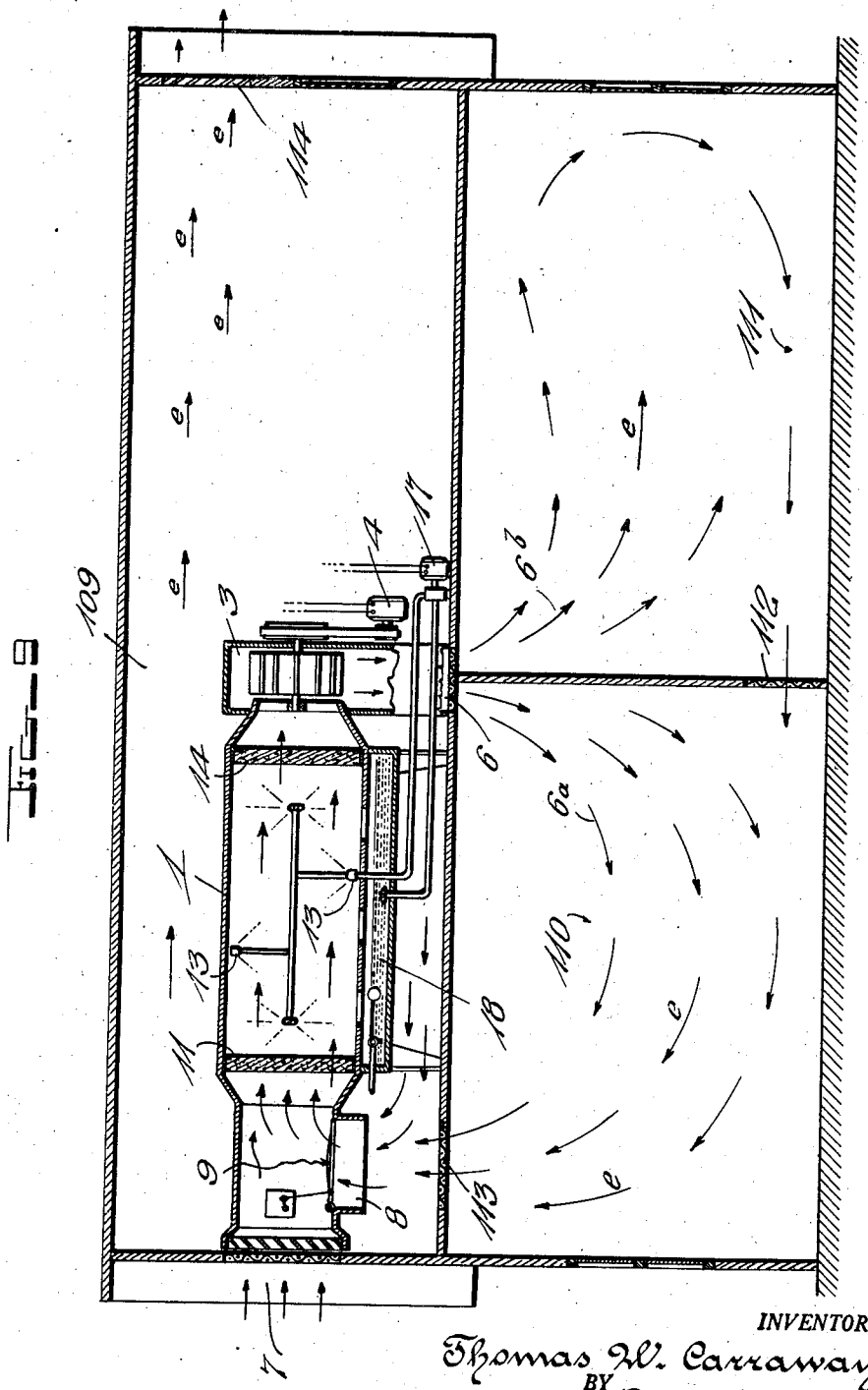


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UNITED STATES PATENT OFFICE

2,342,841

AIR CONDITIONING OR COOLING SYSTEM

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Application March 31, 1941, Serial No. 386,140

10 Claims. (Cl. 236—44)

This invention relates to air conditioning or cooling systems and more particularly to such systems in which air cooling is effected by evaporation of water or other suitable evaporative liquid.

The cooling of air by evaporation of liquid in contact with the air is well known and there have been numerous installations of cooling equipment operating upon this principle. Many of the prior installations, and numerous proposals as to other installations, included rather complex and expensive equipment for refrigerating water used as the evaporative liquid, for reheating the air after cooling for dehumidification, and for otherwise providing very close thermal and humidity control. Such equipment may be desirable from the standpoint of providing extremely close control but is far too expensive to permit its being used in domestic or other installations in which the often doubtful advantage of extremely close control is not worth the large additional expense of achieving it.

Other evaporative cooling systems, lacking such intricate controls have been unsatisfactory principally because of their failure to provide sufficient cooling with unrefrigerated water employed as the evaporative liquid, and because of the frequent undue over-humidification of the air resulting in its feeling clammy and uncomfortable to persons in the conditioned area or enclosure.

An object of the present invention is to provide an air cooling unit of the evaporative liquid cooling class in which the liquid is presented to the air stream in such manner as to provide for efficient cooling of the air by evaporation.

Another object is to provide means for controlling the blower and liquid supplying means of an evaporative liquid type air cooler which, though flexible and adapted to effect efficient control under varying air conditions, is simple and inexpensive.

Other objects will become apparent from a reading of the following detailed description, the appended claims, and the accompanying drawings, in which:

Figure 1 is a longitudinal vertical sectional view of an air conditioning unit constructed in accordance with the invention and showing control means therefor diagrammatically;

Figure 2 is an end elevation of the unit shown in Figure 1;

Figure 3 is a longitudinal vertical sectional view of a different form of unit embodying the invention and with the controls therefor shown diagrammatically;

Figure 4 is a transverse vertical sectional view taken on the line 4—4 of Figure 3;

Figure 5 is a longitudinal sectional view of a still further form of unit constructed in accordance with the invention and showing the controls therefor diagrammatically;

Figure 6 is a transverse vertical section on the line 6—6 of Figure 5;

Figure 7 is a side elevation of a further form of unit embodying the invention with some parts broken away and other parts shown in section;

Figure 7a is a schematic view of an air cooling apparatus including a unit of the kind shown in Figure 7;

Figure 8 is a front elevation of the unit shown in Figure 7 with some parts broken away and others shown in section, and showing controls diagrammatically; and

Figure 9 is a diagrammatic view of a building with a unit of the kind shown in Figures 1 and 2 arranged therein for conditioning air.

In the embodiment shown in Figures 1 and 2 a duct or casing 1, supported on legs 2, is provided with a blower 3 driven from a motor 4 by a belt 5, the arrangement being such that the blower draws air through the duct 1 and discharges it through an opening 6 to the enclosure to be conditioned. Air enters the casing 1 through a fresh air inlet 7 arranged to communicate with the outside and also through a return air inlet 8 adapted to receive air from the enclosure being conditioned.

It is desirable to provide a flow of substantially all fresh air under normal conditions, but at certain times atmospheric conditions require that the inflow of fresh or outside air be cut off and air from the conditioned area be recirculated through the cooling apparatus. For controlling the kind of intake air a damper 9 is pivoted as at 10 at the point of convergence of the inlet openings 7 and 8 remote from the discharge end of the duct.

In order to remove the impurities, such as dust, pollen, and other foreign matter, a filter 11 is positioned transversely of the casing 1 adjacent its inlet end. The filter may comprise a matlike mass of excelsior, glass wool or any other suitable air pervious filtering structure. The air flowing in the direction of the arrows *a* and after passing through the filter 11 enters a cooling chamber 12 in which is mounted a plurality of spray nozzles 13 from which water or other suitable evaporative liquid is sprayed for cooling the

air by evaporation in accordance with well known principles. After passing through the cooling chamber 12 the air moves through a baffle 14 which acts to eliminate from the air stream any suspended moisture particles which have not been compieted evaporated. The baffle 14 may also be formed as a mat of excelsior, glass wool, or other suitable or known material.

Water, or other evaporative fluid, is delivered to the spray nozzles 13 through a feed pipe 15 receiving the fluid under pressure from the pump 16 driven by a motor 17. The water supply may be maintained in a sump or reservoir 18 which is connected to the intake side of the pump by a pipe 19. Preferably, water is maintained at a predetermined level in the reservoir or sump 18 by means of an inlet pipe 20, the flow of water through which is controlled by a float valve 21 which may be of any suitable or conventional form.

In operation, the inlet air, comprising fresh air entering through the opening 7, passes through the filter 11 which removes foreign matter from the air stream and thence the air passes into the cooling chamber 12 where it is cooled by evaporation of water or other evaporative fluid sprayed into the chamber through the nozzles 13. The cooled air then passes through the baffle 14 which removes any entrained liquid particles and then is delivered through the discharge opening 6 to the area or enclosure being conditioned. This form of air cooler is well adapted for use where the water or other evaporative liquid available is substantially free from foreign matter and does not tend to deposit a scale which would clog the nozzles 13.

Novel and improved any very flexible means are provided for controlling the blower, the evaporative liquid supply, and the damper 9, in accordance with varying conditions. The blower is normally controlled by a thermostat 22 located in the conditioned area and the pump normally is controlled by a humidostat 23 located in the conditioned area. Alternatively operable manual controls are provided for obtaining the best results for providing human comfort under special or unusual atmospheric conditions. In the wiring arrangement, shown diagrammatically, electrical power is supplied to the main line conductors 24 and 25 which lead to the inlet side of a master cut-off switch 26. The other side of the switch 26 has connected to it conductors 27 and 28. The conductor 28 leads to one side of the blower motor 4 and the conductor 27 leads through the thermostat 22 and a conductor 29 to the other side of the motor 4. A manually operable switch 30 is adapted to be shunted across the thermostat 22 for completing the motor circuit irrespective of the temperature within the conditioned area under special conditions which may make this desirable.

One side of the humidostat 23 is connected by a conductor 31 to a conductor 32 which in turn leads to the conductor 28. The conductor 31 also is connected to a conductor 33 which leads to one contact of a single pole double-throw switch 34. The other side of the humidostat leads through a conductor 35 to the other contact of the switch 34. The middle or blade contact of the switch 34 leads through a conductor 36 to one side of the pump motor 17. The other side of the pump motor leads through a conductor 37 to the conductor 29 which, as previously stated, leads through the thermostat 22 (or the manually operable switch 30) to the conductor 27 and thence to the master switch 26.

Assuming that normal summer conditions prevail, i. e., during the day time and with reasonably dry and warm outside air, the apparatus will be conditioned for normal operation by having the damper 9 set in the position shown in full lines in Figure 1 and by closing the master switch 26, opening the manually operable switch 30, and closing the blade of the switch 34 on the contact connected to the conductor 35. If the temperature of the conditioned area rises above a predetermined temperature for which the thermostat 22 has been set, the thermostat will respond to close the circuit to the blower motor 4 so as to operate the blower and draw fresh air through the inlet 7 and the cooling chamber 12 and deliver it to the area being conditioned. Assuming also that the humidity of the air in the conditioned area is not above a predetermined value, the humidostat 23 will be in condition for closing the circuit through the pump motor 17 so as to drive the pump 16 and deliver evaporative liquid through the spray nozzles 13. It will be observed that the pump motor 17 cannot operate unless the blower motor also is operating. When the temperature in the conditioned enclosure has been lowered to a predetermined value for which the thermostat is set, the thermostat will respond to open the circuits to both the blower motor 4 and the pump motor 17, thereby stopping the blower and discontinuing the delivery of evaporative fluid to the spray nozzles. However, if the humidity in the area being conditioned should rise to a predetermined upper limit before the temperature has dropped to the desired value the humidostat 23 will open to break the circuit to the pump motor 17 only, so as to discontinue the delivery of the evaporative fluid to the spray nozzles 13 without, however, stopping the blower.

In some instances it may be advantageous to cool the conditioned area to a temperature lower than at which the thermostat 22 normally would discontinue operation of the cooling unit. For example, if in the morning it is anticipated that the day will become unusually hot later on, the manually operable switch 30 may be closed so as to shunt the thermostat and maintain the cooling unit in operation so as to reduce the temperature of the conditioned area to a level lower than that usually maintained before the unit becomes subjected to the heavy load of maintaining the conditioned area cool when the outside temperature is abnormally high.

Under some conditions it may be desirable to operate the blower without supplying evaporative liquid to the spray nozzles 13. For example, it may be assumed that a store or barber shop is opened at an early morning hour and it is desired to remove the stagnant air remaining in the enclosure during the night. The temperature within the enclosure, as well as the outside temperature, may be low enough so that it would be useless to consume evaporative liquid when it is desired merely to flush out and supply clean cool air to the enclosure. Under these conditions the switch 34 is opened so as to disable the liquid supplying means entirely and the switch 30 is closed so as to operate the blower only for such period as is necessary to properly condition the enclosure.

If, during the middle of the day, it is very hot and dry, improved cooling results may be obtained by placing the pump motor 17, as well as

the blower motor 4, under the control of the means which normally controls the blower motor 4. To effect such control the blade of the switch 34 is closed upon the contact leading to the conductor 33 whereby the pump motor 17 will be operated to effect delivery of evaporative fluid to the nozzles 13 whenever the blower motor 4 is running, irrespective of whether the blower motor is controlled by the thermostat 22 or the manually operable switch 30.

Under normal conditions the damper 9 is in position to leave the fresh air inlet 7 fully open, as shown in full lines in Figure 1, but under some conditions it is desirable to cut off the supply of fresh air and to cause return air to be delivered to the cooling chamber. Preferably the damper is adapted to be moved so as substantially to shut off the supply of fresh or outside air by means of a damper operating motor 38 which may be of conventional form and which is adapted to move the damper 9 through an operating connection 39. For controlling the motor 38 and moving the damper 9 automatically in dependence upon outside atmospheric conditions, a humidostat 40 is connected by a conductor 41 through a switch 42 to the supply line 27. Another conductor 43 leads from the humidostat to the damper motor 38 and a third conductor 44 leads from the humidostat to the damper motor. A conductor 45 leads from the damper motor to the supply line 28. Under normal conditions the manually operable switch 42 is closed so that the position of the damper 9 will be controlled by the humidostat 40. If the outside air is reasonably dry the humidostat 40 will cause the motor 38 to move or maintain the damper 9 in the position shown in full lines in Figure 1, so as to provide for intake of fresh air. If the humidity of the outside air becomes excessive, for example, as a result of rain or fog, the humidostat 40 will respond to effect operation of the motor 38 to move the damper 9 to the dotted line position so as substantially to cut off the inflow of outside air. By eliminating or restricting the admission of excessively humid air during such periods, the hazard of damaging wall paper, fabrics, wooden furniture and the like, in the conditioned area, from excessive moisture is eliminated. When the outside air becomes more normal as to its humidity content the humidostat 40 will respond to cause the damper 9 to be returned to its normal position so as to provide for the desired inflow of fresh outside air. If for any reason it is desired to leave the damper in set position this may be accomplished by opening the manually operable switch 42 which will disable the humidostat 40 and render it ineffective for controlling the damper 9.

Special conditions may require that the damper 9 be moved to or maintained in a position other than that to which it would be moved or in which it would be maintained by the humidostat 40. For this reason a manually operable single pole double-throw switch 46 is provided, the blade of the switch being connected through the conductor 47 to the supply line 27. Conductors 48 and 49 lead respectively from the switch contacts to the damper control motor 38. By closing the switch blade selectively upon the contacts associated with the conductors 48 and 49, the damper may be moved to any desired position to suit existing conditions.

In some localities it is difficult or expensive to provide a supply of water or other evaporative liquid which will not tend to clog spray nozzles, such as the spray nozzles shown in Figures 1 and 2. Even if the supply of liquid is filtered to remove suspended foreign matter, the liquid still may contain substances in solution which deposit out as scale and eventually clog the nozzles. Figures 3 and 4 illustrate an embodiment of the invention particularly suited for use in localities in which the easily available evaporative liquid is not suitable for use in units equipped with spray nozzles. The unit shown in Figures 3 and 4 includes a duct or casing 50 through which air is moved in the direction of the arrows *b* by means of a blower 51 drivingly connected to a motor 52 by a belt 53. Air moved through the casing after being cooled is delivered through a discharge opening 54 to the area or enclosure to be conditioned. The interior of the casing 50 communicates with a fresh air inlet 55 and a return air inlet 56, the relative amounts of fresh air and return air admitted to the casing being controlled by a damper 57 pivoted as at 58. The inlet air passes through a filter 59 for removing suspended foreign matter, thence through an open chamber portion and then through a mat 60 of excelsior, steel wool, glass wool or any other suitable mat of air pervious material formed with multitudinous air spaces or passages. In accordance with the invention, the mat 60 is maintained wet so as to provide multitudinous liquid films adjacent the numerous air passages and in contact with the air so as to be available for cooling the air by evaporation. A pump 61 is adapted to receive evaporative liquid from a sump or reservoir 62 in which liquid is maintained at a predetermined level by means of a supply pipe 23 controlled by a float valve 64, of conventional form. The pump is driven by a motor 65 to deliver fluid through a pipe 66 which communicates with a horizontal header 67 extending across the top of the mat 60 and being perforated so as to provide for the free flow of liquid into the top of the mat.

In operation, liquid supplied through the pipe 66 is delivered by the header 67 to the top of the mat 60 and trickles down through the mat so as to cover each thread or portion thereof with a film of moisture which thereby is presented for contact with and evaporation by the stream of air passing through the casing 50 whereby the air is cooled by evaporation before being delivered to the conditioned area.

The means for controlling the operation of the blower motor 52, the pump motor 65, and the damper 57 may be the same as the means for controlling the blower motor 4, the pump motor 17, and the damper 9 in the construction shown in Figures 1 and 2. Consequently, the means for controlling the apparatus shown in Figures 3 and 4 will not be described in detail. Parts of the control means shown in Figures 3 and 4 are designated by reference characters the same as those which designate the corresponding parts shown in Figures 1 and 2.

Figures 5 and 6 show another form of unit especially suited for use in localities in which available water or evaporative fluid has a tendency to deposit foreign matter or scale which would clog the orifices of spray nozzles. In this embodiment air is drawn through a duct or casing 68 in the direction of the arrows *c* by means of a blower 69 drivingly connected to a motor 70 by a belt 71. Air drawn through the casing is delivered through a discharge opening 72 to the area or enclosure to be conditioned. A fresh air inlet opening 73 provides for the admission of outside air or return air may be drawn through

a return air inlet 74. A damper 75, pivoted at 76, is provided for controlling the fresh outside air and return air. After passing the damper 75 the inlet air goes through a filter 77 and into and through a cooling chamber 78 where it is cooled by evaporation in a manner to be described and thence passed outwardly through the discharge opening 72. Water or other suitable evaporative fluid is maintained at a predetermined level in a sump or reservoir 78a in the bottom of the cooling chamber 78, the fluid being admitted through a supply pipe 79 controlled by a conventional float valve 80.

A cylinder 81, formed of wire mesh or other suitable open structure, is carried by spiders 82 keyed to a shaft 82a journaled as at 83 within the cooling chamber. A cylindrical mat-like body of excelsior, steel wool, glass wool, or other material having multitudinous air passages, is carried by the open work cylinder 81 and is arranged to dip into the liquid in the sump or reservoir 78a. The cylinder is adapted to be rotated slowly through driving means comprising a pulley 85 connected by a belt 86 to a pulley 87 of a reduction gear assembly 87a connected by a belt 87b to a pulley 87c on a motor 88. In operation the cylinder 81 turns slowly when it is desired to present films of moisture in the path of the air stream for cooling by evaporation. As the mat material 84 passes through the liquid in the reservoir 78a it picks up liquid and carries it transversely through the air stream moving through the cooling chamber. The moisture does not have to be delivered through any small openings or orifices susceptible to becoming clogged by foreign particles or deposited scale. The means for controlling the operation of the blower 89 and moisture supplying means 84 are the same as the control means shown in connection with the apparatus illustrated in Figures 1 and 2 and need not be described again in detail. The several parts of the control means shown in Figure 5 are designated by reference characters the same as those which designate corresponding control parts shown in Figure 1.

Figures 7, 7a and 8 show a modified form of unit which has been found particularly effective in climates which are customarily dry as well as hot. Under these conditions it is desirable to provide for as large an amount of evaporation as possible in order to effect the necessary cooling. The apparatus shown in Figures 7, 7a and 8 is capable of taking advantage of the dry air for effecting maximum cooling and at the same time is compact and therefore adapted to be fitted within a small space so often necessary in domestic installations. The air to be cooled is moved in the direction of the arrows *d* through a duct or casing 89 containing the cooling unit and is discharged through an opening 90 communicating with the area or enclosure to be cooled. Fresh air from the outside may enter through an inlet opening 91 or return air may be admitted through an opening 92, a damper 93 being provided for controlling the fresh air and return air admitted to the cooling unit.

The cooling unit generally designated 94 is adapted to be housed entirely within the duct or casing 89. The unit comprises four sides, 95, 96, 97 and 98, three sides, 96, 97 and 98, of which comprise mats 96a, 97a and 98a, respectively, of excelsior, steel wool, glass wool, or similar material, whereas the side 95 may be imperforate. A blower 99, located within the four sides of the housing, is driven from a motor 100 by means of a belt 101. Evaporative liquid is maintained at a predetermined level in a sump or reservoir 102 by means of a supply pipe 103 controlled by a conventional float valve 104. A pump 105, driven by a motor 106, delivers fluid from the sump to a pipe 107 and thence to horizontal delivery pipes or headers 96b, 97b and 98b respectively overlying the tops of the mats 96a, 97a and 98a. In operation, air drawn through the casing 89 has to pass through the mats 96a, 97a and 98a which are maintained wet with multitudinous films of evaporative liquid which, through evaporation, cool the air before it passes out through the discharge opening 90. The means for controlling the blower 99 and evaporative liquid supplying means is similar to the control means described in connection with the form shown in Figure 1 with the exception that for controlling the apparatus shown in Figures 7 and 8 a clock switch 108 is interposed in the conductor 36 and is so adjusted as to prevent operation of the evaporative liquid supplying means during certain predetermined hours. For example, it may be advantageous to automatically disable the water supplying means during the night so as to allow the blower to operate as a ventilating system drawing in outside air which is cleansed by the filtering action of the mats 96a, 97a and 98a and delivered into the conditioned enclosure without lowering the temperature by evaporation. At a predetermined time in the morning the clock will automatically place the liquid supplying means back under the control of the humidostat and the thermostat so as to provide for cooling by evaporation when conditions in the conditioned enclosure require it.

Figure 9 shows diagrammatically a house installation of a unit of the kind shown in Figures 1 and 2. The other units described, however, may be similarly installed in a house and good results obtained. The house is shown as including an upper attic enclosure 109 and two lower room enclosures 110 and 111. The cooling unit is installed with its discharge opening 6 arranged so as to deliver divided air streams at 6a and 6b respectively into the rooms 110 and 111 at their ceiling level. Fresh air from the outside is drawn in through the inlet opening 7. Return air from the room 111 passes through a passage 112 near the floor into the room 110 and the return air from both rooms 110 and 111 passes up through the return air passage 113 which communicates with the attic 109, it being noted, however, that the passage 113 does not have direct or closed communication with the air cooling unit. Return air, after passing through the passage 113, has to move through the attic space 109 as indicated by the arrows *e*. Thus the return air, after leaving the conditioned enclosure, moves through the attic and out through a wall outlet 114, instead of being discharged directly outside the conditioned enclosure and cools the attic, maintaining the ceilings of the conditioned rooms cool. By moving a large volume of cool air through the attic, overheating of the attic, which normally would be excessive during hot summer days, is prevented and the resultant maintenance of cool ceiling of the rooms below adds greatly to the comfort of occupants of the conditioned rooms. Return air enters through the opening 8 only when the damper 9 is moved to close or partially close the fresh air inlet 7 and this takes place only when either the humidostat 40 responds to excessive moisture in the outside air,

or the manually operated switch 46 is closed on the appropriate contact.

The air conditioning units and installations disclosed herein embody the invention in the forms now preferred, but it will be understood that changes may be made without departing from the invention as defined in the claims. For example, it is apparent that a solenoid-operated valve controlling a flow of fluid to the fluid film dispersion means may be employed instead of a motor driven pump as disclosed herein.

I claim:

1. In an air conditioning system, an enclosure to which cooled air is to be delivered; a conditioning chamber having an inlet and having an outlet arranged to discharge cooled air to said enclosure; a blower for moving air through said chamber and to said enclosure; means for supplying liquid within said chamber to effect evaporative cooling of air passing therethrough; a thermostat responsive to temperature in said enclosure for controlling operation of said blower and said liquid-supplying means; and manually operable means for controlling operation of said blower and said liquid-supplying means independently of said thermostat.

2. In an air conditioning system, an enclosure to which cooled air is to be delivered; a conditioning chamber having an inlet and having an outlet arranged to discharge cooled air to said enclosure; a blower for moving air through said chamber and to said enclosure; means for supplying liquid within said chamber to effect evaporative cooling of air passing therethrough; a thermostat responsive to temperature in said enclosure for controlling operation of said blower and said liquid-supplying means; manually operable means for controlling operation of said blower and said liquid-supplying means independently of said thermostat; and a humidostat responsive to the humidity in said enclosure for controlling said liquid-supplying means conjointly with the means controlling the blower.

3. In an air conditioning system, an enclosure to which cooled air is to be delivered; a conditioning chamber having an inlet and having an outlet arranged to discharge cooled air to said enclosure; a blower for moving air through said chamber and to said enclosure; means for supplying liquid within said chamber to effect evaporative cooling of air passing therethrough; a thermostat responsive to temperature in said enclosure for controlling operation of said blower and said liquid-supplying means; manually operable means for controlling operation of said blower and said liquid-supplying means independently of said thermostat; a humidostat responsive to the humidity in said enclosure for controlling said liquid-supplying means conjointly with the means controlling the blower; and a selector device for selectively placing the liquid-supplying means under the conjoint control of the blower controlling means and said humidostat, or under the control of the blower controlling means independently of said humidostat.

4. In an air conditioning system, an enclosure to which cooled air is to be delivered; a conditioning chamber having an inlet and having an outlet arranged to discharge cooled air to said enclosure; a blower for moving air through said chamber and to said enclosure; means for supplying liquid within said chamber to effect evaporative cooling of air passing therethrough; means for controlling operation of said blower; a humidostat responsive to humidity in said enclosure; and a selector device for selectively placing said liquid-supplying means under conjoint control of said blower control means and said humidostat or under control of said blower controlling means independently of said humidostat.

5. In an air conditioning system, an enclosure to which conditioned air is to be delivered; a duct for delivering conditioned air to said enclosure; means including a discharge opening for moving air through said duct and discharging conditioned air to said enclosure; a fresh air inlet communicating with air outside said enclosure and being adapted to communicate with said duct, a return air inlet communicating with said enclosure and being adapted to communicate with said duct; a damper for controlling the fresh air and return air entering the duct; and means for supplying liquid within said duct to effect evaporative cooling of air passing therethrough; and means constituting the sole atmospheric condition responsive means for controlling operation of said damper comprising a humidostat responsive to a predetermined high humidity of the fresh air for effecting operation of said damper to restrict the inflow of fresh air to a minimum, and responsive to humidity below said predetermined high humidity for effecting operation of said damper to provide for a normal inflow of fresh air.

6. In an air conditioning system, an enclosure to which conditioned air is to be delivered; a duct for delivering conditioned air to said enclosure; means including a discharge opening for moving air through said duct and discharging conditioned air to said enclosure; a fresh air inlet communicating with air outside said enclosure and being adapted to communicate with said duct, a return air inlet communicating with said enclosure and being adapted to communicate with said duct; a damper for controlling the fresh air and return air entering the duct; a humidostat responsive to a predetermined high humidity of the fresh air for effecting operation of said damper to restrict the inflow of fresh air to a minimum, and responsive to humidity below said predetermined high humidity for effecting operation of said damper to provide for a normal inflow of fresh air; and means operable independently of said humidostat for effecting operation of said damper to restrict inflow of fresh air to a minimum or to provide for a normal inflow of fresh air.

7. In an air conditioning system, an enclosure to which conditioned air is to be delivered; a duct for delivering conditioned air to said enclosure; means including a discharge opening for moving air through said duct and discharging conditioned air to said enclosure; a fresh air inlet communicating with air outside said enclosure and being adapted to communicate with said duct, a return air inlet communicating with said enclosure and being adapted to communicate with said duct; a damper for controlling the fresh air and return air entering the duct; means for supplying liquid within said duct to effect evaporative cooling of air passing therethrough; and means constituting the sole atmospheric condition responsive means for controlling operation of said damper comprising a humidostat responsive to a predetermined high humidity of the fresh air for effecting operation of said damper to restrict the inflow of fresh air to a minimum, and responsive to humidity below said predetermined high humidity for effecting op-

eration of said damper to provide for a normal inflow of fresh air; means for rendering said humidostat ineffective for controlling operation of said damper; and damper operation controlling means operable independently of said humidostat and irrespective of whether or not said humidostat is conditioned to be effective for controlling operation of said damper.

8. In an air conditioning system, an enclosure to which cooled air is to be delivered; a conditioning chamber having an outlet arranged to discharge cooled air to said enclosure; a fresh air inlet communicating with air outside said enclosure and being adapted to communicate with said chamber; a return air inlet communicating with said enclosure and being adapted to communicate with said chamber; a damper for controlling the fresh air and return air entering the chamber; a blower for moving air through said chamber; means for supplying liquid within said chamber to effect evaporative cooling of air passing therethrough; a thermostat responsive to temperature in said enclosure for controlling operation of said blower; manually operable means for controlling operation of said blower independently of said thermostat; a humidostat responsive to humidity in said enclosure; means for selectively conditioning the liquid supplying means to be completely inoperative, or to be operative under the control of the blower controlling means, or to be operative under the joint control of the blower controlling means and the humidostat; a second humidostat responsive to a predetermined high humidity of the fresh air for effecting operation of said damper to restrict the inflow of fresh air to a minimum and responsive to humidity below said predetermined high humidity for effecting operation of said damper to provide for a normal inflow of fresh air, means for rendering said second humidostat ineffective for controlling operation of said damper; and damper operation controlling means operable independently of said second humidostat and irrespective of whether or not said second humidostat is conditioned to be effective for controlling operation of said damper.

9. In an air conditioning system, an enclosure to which cooled air is to be delivered; a conditioning chamber having an inlet and having an outlet arranged to discharge cooled air to said enclosure; a blower for moving air through said chamber and to said enclosure; means for supplying liquid within said chamber to effect evaporative cooling of air passing therethrough; a thermostat responsive to temperature in said enclosure for controlling operation of said blower and said liquid-supplying means; and clock controlled means for rendering said liquid-supplying means ineffective during predetermined periods irrespective of response of said thermostat to temperature changes.

10. In an air conditioning system, an enclosure to which cooled air is to be delivered; a conditioning chamber having an inlet and having an outlet arranged to discharge cooled air to said enclosure; a blower for moving air through said chamber and to said enclosure; means for supplying liquid within said chamber to effect evaporative cooling of air passing therethrough; a thermostat responsive to temperature in said enclosure for controlling operation of said blower and said liquid-supplying means; manually operable means for controlling operation of said blower and said liquid-supplying means independently of said thermostat; and clock controlled means for rendering said thermostat incapable of effecting operation of said liquid-supplying means during predetermined periods.

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