

Aug. 23, 1938.

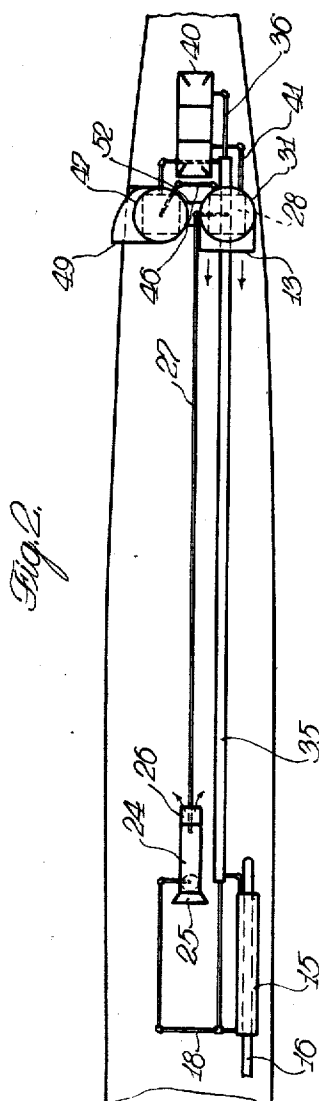
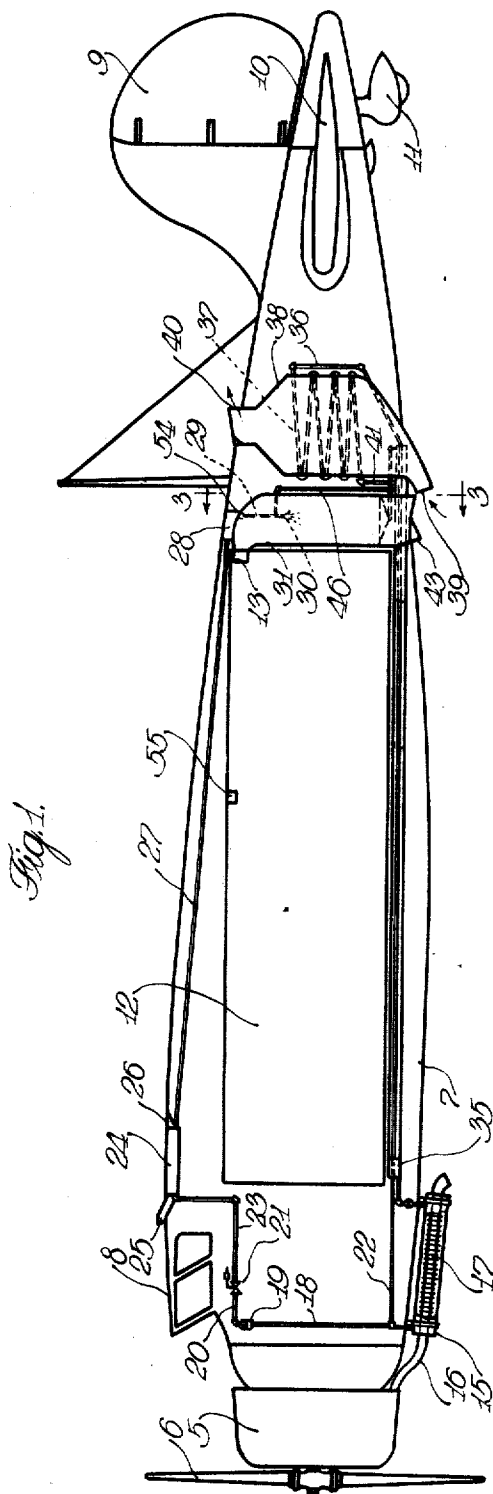
R. B. P. CRAWFORD

2,127,993

AIR CONDITIONING SYSTEM FOR AEROPLANES OR THE LIKE

Filed April 26, 1933

2 Sheets-Sheet 1



Inventor:
Robert B. P. Crawford
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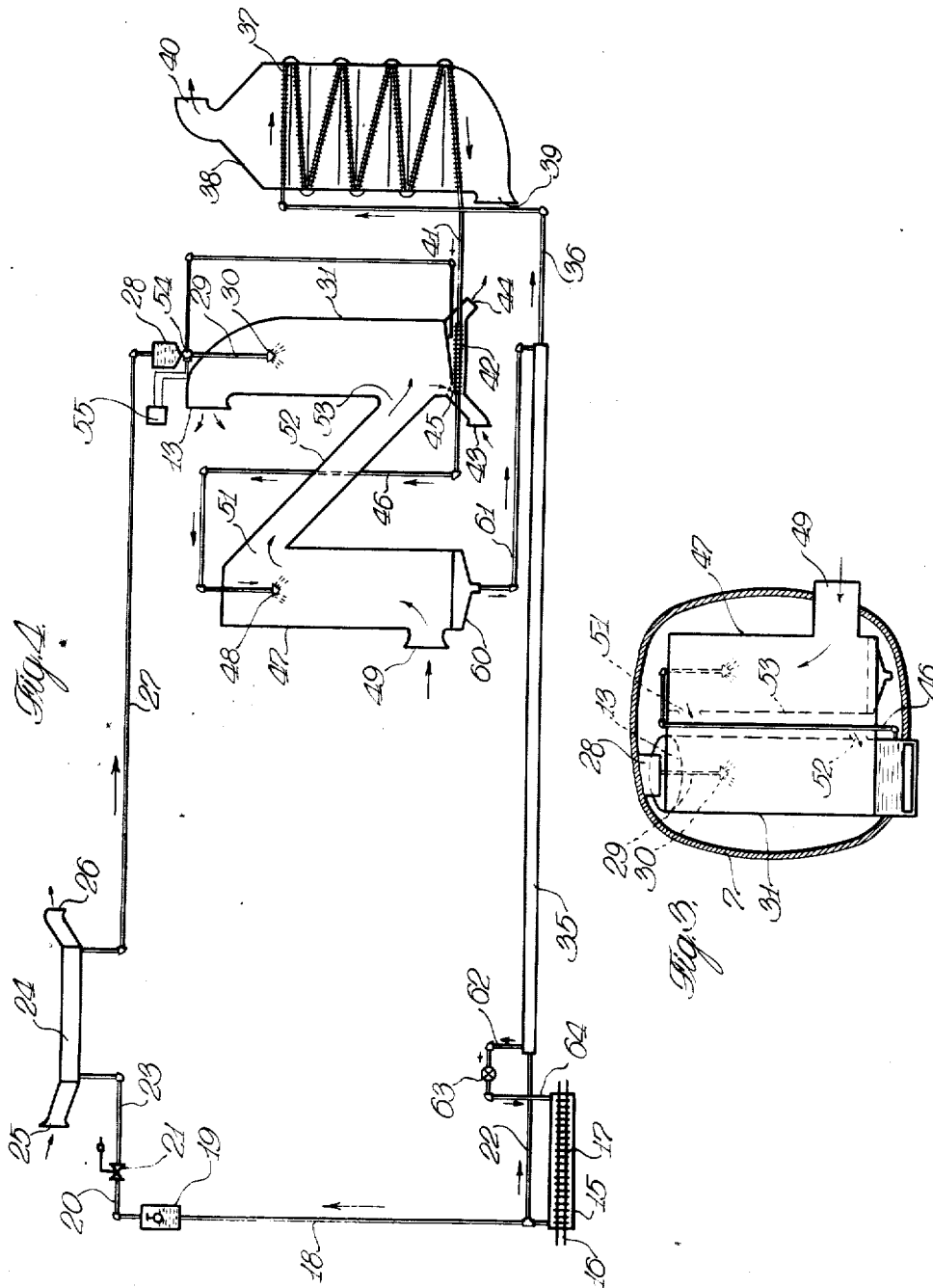
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UNITED STATES PATENT OFFICE

2,127,993

AIR CONDITIONING SYSTEM FOR AEROPLANES OR THE LIKE

Robert B. P. Crawford, Fort Worth, Tex.

Application April 26, 1933, Serial No. 667,970

15 Claims. (Cl. 62-176)

This invention relates to air conditioning systems for aeroplanes or the like, and is more particularly directed to an air conditioning system for cabin-type transport planes, being adapted to supply a predetermined flow of cool, dry air into the interior of the cabin of the plane, the humidity and the temperature of the air thus supplied being automatically controlled.

In considering the problem of conditioning air for a moving vehicle, such as an aeroplane, attention must be directed to providing a system that is extremely light in weight, economical in construction and operation, and requires but a small space for installation.

Also the problem of producing necessary dehumidifying and cooling without extensive refrigeration, that is, without the necessity of carrying a large quantity of water or bulky refrigerating apparatus, as well as the elimination of extensive duct work or the like, must be considered.

In the preferred embodiment of the invention, therefore, an air conditioning system of this type has been provided having certain novel features of design and certain operating characteristics which attain the desirable requirements set forth above. The system to be hereinafter disclosed in detail is characterized by the elimination of all moving parts, with the use of exhaust gases from the engine of the plane as a source of energy for effecting operation of the system, thus eliminating any power sources, such as motors, pumps, or the like.

Another feature of the present invention resides in providing a system wherein the movement of the plane provides the necessary circulation of air through the system and also produces the necessary air circulation for cooling purposes. No pressure or vacuum exists in any portion of the system, since the direction of flow of air is in one direction throughout the entire system. Also, no blower fan is necessary for providing circulation.

Further, I preferably provide an extended interchanger for eliminating heat loss between the operating temperature of the dehumidifying solution used in the system and the boiling temperature of the solution necessary for removing absorbed moisture therefrom. This is accomplished by providing an absolute countercurrent flow of the concentrated solution from the heating means and the diluted solution from the dehydrating chamber through heat transfer contact.

A further feature of the invention is the provision of a system of this type which is installed

within the plane in such manner as to utilize space which is not otherwise used, and which may be readily installed without any modification of present transport plane design. In connection with this feature, the provision of a system having no moving parts and no accessory refrigerating apparatus or the like results in a relatively light weight system which does not materially add to the weight of the plane.

In order to further reduce the weight of such a system, as well as its spacial requirements, I preferably remove the absorbed moisture from the dehydrating solution by heating the solution through the medium of the exhaust gases of the engine, and subsequently condense this moisture and utilize it for reducing the temperature of the dehydrated air by adiabatic evaporation. The unevaporated moisture is then forced through an aftercooler to effect final cooling of the concentrated dehydrating solution before its admission to the dehydrating chamber. This eliminates the necessity of providing a water supply tank or the like as an adjunct to the system.

The circulation of the dehydrating solution is effected by a thermo-siphon system of percolation, the heated concentrated solution rising to the top of the cooling tower and descending as it is progressively cooled, thence passing through the aftercooler to the dehydrating chamber. In this manner, circulation of the concentrated solution is effected without the use of pumps or the like.

Other objects and advantages of the present invention, directed to the provision of a system which is small in size, light in weight, and economical in construction and operation, will appear more fully from the following detailed description which, taken in connection with the accompanying drawings, will disclose to those skilled in the art the particular construction and operation of a preferred form of my invention.

In the drawings:

Figure 1 is a diagrammatic side elevational view of a common type of transport plane provided with the air conditioning system of the present invention;

Figure 2 is a partial plan view of the plane shown in Figure 1;

Figure 3 is a sectional elevational view taken substantially on the line 3-3 of Figure 1; and

Figure 4 is a diagrammatic outline showing the circulating cycle of the air stream and of the dehydrating solution.

Referring now to the drawings in detail, in Figure 1 I have disclosed a common type of

cabin transport plane, which is provided with the motor 5 driving any desired type of propeller 6, disposed at the forward end of a fuselage indicated generally at 7. Placed forwardly and upwardly of the fuselage 7 is the pilot's compartment 8, as is well known, and at the rear portion of the fuselage 7 is provided the rudder 9 and the elevators 10. A landing skid or wheel 11 is also provided at the tail of the plane.

Considering now in detail the application of an air conditioning system to such a design of plane, the cabin of the plane is indicated generally by the rectangle indicated by the numeral 12. At the rear end of the cabin 12, and adjacent the ceiling thereof, is provided the conditioned air inlet 13, through which the conditioned air from the conditioning system is forced into the cabin, the air escaping through window cracks and the like in the cabin. This constitutes an "exfiltration" type of system in which the pressure within the cabin is maintained slightly above atmospheric pressure in order to provide for expulsion of the vitiated air out of the window cracks and the like, thus providing for the necessary ventilation within the cabin.

Disposed forwardly of the cabin 12 and beneath the fuselage 7 of the plane is a heater indicated generally at 15 which is disposed about the exhaust pipe 16 leading from the engine or motor 5 of the plane. The exhaust pipe 16 is provided with a finned portion 17 disposed within the heater 15 for effecting rapid heat transfer between the exhaust gases within the pipe 16 and the solution entering the heater 15. The heater is secured to the lower surface of the fuselage 7 in any desired manner. Extending upwardly from the heater 15 is the conduit pipe 18, which is adapted to conduct the heated solution to a check controlled valve member 19 forming a vapor trap, which prevents the heated lithium chloride from passing upwardly into the pipe 20. However, the moisture evaporated from the solution and in the form of heated vapor passes or percolates through the solution and builds up in the vapor trap 19 leading into the pipe 20. This check valve 19 is float-controlled to prevent the lithium chloride solution from passing therethrough.

A pressure release valve 21, preferably provided with the usual type of metered by-pass and set at a pressure such as to insure a pressure sufficient to overcome the frictional resistance due to circulation of the lithium chloride solution, is disposed in the conduit 20 above the check valve 19 and assures the building up of a steam vapor pressure such that there will be positive forced circulation of the lithium chloride through a second conduit member 22 leading rearwardly from the forward end of the heater 15. The moisture vapor, which has percolated through the solution into the vapor trap 19, forces the liquid downwardly to open the valve controlling conduit 20, and passes through the pressure release valve 21 into a conduit 23 leading to a suitable condenser 24 disposed in the roof of the fuselage immediately back of the pilot compartment 8.

An inlet 25, projecting above the surface of the roof of the pilot compartment, is adapted to force air into the condenser upon movement of the plane, and into heat transfer relationship with suitable pipe coils containing the moisture vapor to condense the same. An exhaust outlet 26 is provided for the air entering the condenser 24. The condensed moisture or water from the

condenser 24 is conducted through pipe 27 to a suitable water reservoir 28, shown in Figure 3, and from thence it is conducted through the pipe 29 to a spray head 30 disposed within the evaporating chamber 31.

The concentrated solution leaving the heater 15 is conducted through pipe 22 to an interchanger 35, which is disposed axially within the fuselage 7 and below the cabin 12. In the interchanger 35, the concentrated solution is cooled by contact with the diluted solution returning to the heater 15, and emerges from the exchanger 35 through pipe 36 at a substantially reduced temperature. The concentrated solution is then led from the pipe 36 to the upper coil 37 of a plurality of coils disposed within the cooling tower 38. The solution is cooled within the tower 38 by heat transfer contact with an air stream forced thereinto through the air inlet 39 disposed immediately beneath the fuselage 7 which scoops air into the cooling tower and out through the exhaust 40 disposed immediately forwardly of the rudder member 9.

As the concentrated solution passes downwardly through the coil 37, it is successively cooled by countercurrent contact with the air stream and assumes a temperature considerably lower than its entering temperature at the top of the tower. The lower coil of the cooling tower is connected through pipe 41 with an aftercooler 42 disposed within the base of the evaporator 31. The aftercooler 42 comprises an extended surface cooling coil which is subjected to air flow entering the inlet 43 and being exhausted through the outlet 44, the air being circulated by the movement of the plane through the air. Also, a portion of the water sprayed from the spraying nozzle 30 is not evaporated within the evaporator 31, and passes down through the perforations 45 and onto the surface of the extended coil 42. On this surface, it is evaporated by the moving air stream, and consequently cools the surface, effecting a further cooling of the concentrated solution.

The concentrated solution passes from the aftercooler 42 through the conduits 46 to the upper portion of the dehydrating chamber 47. It is then passed downwardly into the spray nozzle 48, and is sprayed into intimate contact with the incoming air which enters the inlet 49 disposed at one side of and extending partially out of the fuselage 7. The air entering the inlet 49 is forced upwardly through the dehydrating chamber 47 by the motion of the plane, and is thoroughly dehydrated therein. The air then passes through the opening 51, disposed at the top of the dehydrating chamber 47, and through the conduit 52 disposed between the dehydrating chamber and the evaporator 31 into the lower end of the evaporator 31 through the port 53. The dehydrated air is then forced upwardly through the evaporator 31, and is sprayed with water from the spray head 30, the water providing for adiabatic evaporation within the evaporator, reducing the temperature of the air to the desired point. A suitable valve 54 is provided for metering the quantity of water sprayed through the nozzle 30, this valve being controlled in any desired manner through a thermostat 55 disposed within the cabin 12 of the plane.

Preferably the valve 54 is of the three-way type, with its other passage connected to a conduit leading into the aftercooler 42. In this manner, the water supplied for cooling the solution in cooler 42 can be derived either by dripping through the perforations 45 in the lower end of

the evaporator from chamber 31, or, in case the flow to the nozzle 30 is restricted by the valve, can pass through the outlet connection of the valve directly into the aftercooler, where it may be sprayed upon the coils containing the solution in any desired manner. Since the solution in conduit 41 is at a temperature slightly higher than atmospheric, the evaporation of this additional water in the aftercooler will result in cooling the solution to a temperature slightly below atmospheric, thus increasing its dehydrating characteristics.

The dehydrating solution sprayed from the nozzle 48 into the dehydrating chamber 47 in contact with the fresh unconditioned air is collected in a sump 60 provided at the base of the chamber 47 together with the moisture absorbed thereby, and is conducted through pipe 61 to the rear end of the interchanger 35. This diluted solution, in passing through the heat interchanger 35, is heated by contact with the pipe 22 containing the hot concentrated solution coming from the heater 15, and consequently, when the diluted solution reaches the pipe 62 leading from the forward end of the interchanger 35, the temperature of the solution has been materially increased. A suitable check valve 63 is provided for preventing backward flow of the solution through the interchanger, and the solution passes through the valve 63 and pipe 64 into the heater 15 disposed about the exhaust pipe 16. This completes the cycle of circulation of the dehydrating solution.

I preferably employ lithium chloride as the dehydrating solution, since it has marked moisture absorbing characteristics and may be readily maintained concentrated by boiling off the absorbed moisture.

Considering briefly the cycle of the solution, after it is collected in the sump 60 it passes through the interchanger 35 to the heater 15, being heated in the interchanger so that it enters the heater at a temperature substantially equal to the temperature at which the moisture may be efficiently removed. In the heater 15, the moisture is evaporated, and the mixture of vapor and solution passes upwardly through the pipe 18 to the float-controlled check valve 19. The percolation of the moisture vapor through the solution forces the solution downwardly in the pipe 18, because of the regulated setting of the pressure release valve 21, and consequently only the moisture vapor or steam passes into the pipe 23 leading to the condenser 24.

This pressure, provided by the percolation of the moisture vapor through the solution, results in the circulation of the lithium chloride through the heat interchanger 35 and upwardly through the coils 37 in the cooling tower 38, and thence through the aftercooler 42 and into the top of the dehydrating chamber 47. The percolation of the moisture vapor thus provides the pressure for producing circulation of the liquid. Also, the thermo-siphon effect of the heated solution results in an increased circulation and a more efficient cooling in the countercurrent cooling coils disposed in the cooling tower 38. The cycle is completed when the concentrated solution is sprayed into the incoming air stream in the dehydrating chamber 47.

It will be seen that during the building up of pressure in vapor trap 19 referred to above, the concentrated solution is gradually pushed out of the regenerator end of the system by the pressure of the vapor generated therein, through cooler 38 to the dehydrator 47. During the evap-

oration phase, the forcing of liquid to the dehydrator is always to the top of the dehydrator and never to the bottom because of check valve 63 which prevents the flow of liquid in the latter direction. At the end of the evaporation phase, liquid begins to return to the regenerator system and the immediate effect of the return is to cause a condensation of vapor in the regenerator which quickly results in the liquor stored in sump 60 of the dehydrator and in the cooler being drawn into and filling the regenerator system whereupon the evaporation phase immediately recommences. While in the system illustrated the return of a portion of concentrated liquor to the regenerator is not of importance because of the relatively large capacity of the dilute liquor in sump 60, this return of concentrated liquor can readily be eliminated by simply putting a check valve in conduit 36 without in any way altering the principle of operation of the apparatus.

The air cycle may be briefly considered to consist of the entrance of fresh unconditioned air through the inlet 49 and up through the dehydrating chamber 47, where it is substantially completely dehumidified, and passes into the lower end of the evaporator 31, where its temperature is reduced by adiabatic evaporation of the sprayed moisture which has been removed from the dehydrating solution. From the evaporator, the air is forced through the inlet 13 into the interior of the cabin 12.

It is thus apparent that I have provided an air conditioning system for use in aeroplanes or the like in which no moving parts are required, and in which the conditioning of the air is provided by the use of a dehydrating solution which is constantly maintained at any desired concentration, and temperature control is effected by the adiabatic evaporation of the moisture removed from the dehydrating solution, which is evaporated in contact with the air stream to cool the same.

It is to be noted that by the provision of the elongated interchanger 35, the diluted solution containing the absorbed moisture, which is at a temperature only slightly above the air temperature, is heated materially while in contact with the hot concentrated solution as it travels to the forward end of the interchanger, and thus is preheated before entering the heater 15 so that only a small quantity of heat is necessary to effect removal of the moisture. Further, the hot concentrated solution in the pipe 22, after traversing the length of the interchanger 35, is substantially cooled to the temperature of the diluted solution entering the interchanger, and is further cooled by contact with the air stream in the cooling tower 38. Also, because of the evaporation cooling effect in the aftercooler 42, the solution being supplied to the chamber 47 is at a temperature substantially equal to atmospheric temperature.

If desired, a suitable tap may be taken off of the moisture reservoir 28, and water may be allowed to circulate over the coils 37 in the cooling tower 38 to effect a greater cooling of the solution, but I have found that this is unnecessary under ordinary conditions.

Further, it is to be noted that by removing the moisture from the diluted solution and utilizing this moisture for temperature control, it is possible to eliminate the need of any water supply tank or the like, thus reducing the weight of the system and also its spacial requirements.

Further, the addition of moisture to the dehydrated air in an amount sufficient to get the required temperature reduction by adiabatic evaporation, followed by the application of the moisture to the aftercooler for the final stage of solution cooling, is of distinct advantage in providing for economy of operation.

Another advantage of the present invention resides in the provision of a vapor trap and a pressure release valve which is set for the pressure corresponding to that required to move the dehydrating solution through its cycle of movement, vaporization of the absorbed water through the concentrated solution providing for separation of the solution from the moisture and movement of the solution under pressure. This is a distinct advantage in eliminating the use of pumps or other circulating means for the solution, although it is within the scope of the invention to employ a pump for use in lowering the boiling point by eliminating the percolating effect, if desired.

Distinct economy of operation, and also of weight and spacial requirements, is effected by the use of exhaust gases as the source of energy for the entire cycle of the dehydrating solution. This eliminates the use of a concentrator, and also the use of auxiliary heating means or the like therefor. Also, by use of the transitory movement of the plane through the air, no blowers or fans are required in order to provide air circulation.

I do not intend, therefore, to be limited to the exact embodiment of the invention which is disclosed in the accompanying drawings, since wide variations may be made both in the particular units described and also in the position or arrangement of the installation without departing from the scope of the present invention, and I intend to be limited only as defined by the spirit and scope of the appended claims.

I claim:

1. In a cabin type aeroplane, an air conditioning system comprising a dehydrating chamber and an evaporating chamber disposed rearwardly of said cabin within the fuselage of said plane, means providing a passage for the flow of air successively through said dehydrating chamber and said evaporating chamber and into the cabin of the plane, a heat interchanger disposed immediately beneath said cabin and extending from said chambers to the forepart of said cabin, a regenerator disposed about the exhaust pipe of the motor of said plane exteriorly of said fuselage, a condenser disposed in the top of said fuselage immediately rearwardly of the pilot's compartment, conduit means for the flow of liquid from said regenerator to said dehydrating chamber and from said dehydrating chamber to said regenerator by way of said heat interchanger, conduit means for the flow of vapor from said regenerator to said condenser, and conduit means for the flow of condensate from said condenser to said evaporating chamber.

2. An air conditioning system for an aeroplane utilizing adiabatic evaporation of water for effecting cooling of the air, comprising a dehydrating chamber, means in said chamber for absorbing moisture from an incoming fresh air stream into a dehydrating solution, a regenerator for concentrating said solution and liberating the absorbed moisture, and means for collecting and condensing the liberated moisture to provide for evaporative cooling of said concentrated solution.

3. The combination with an air conditioning

system for a moving vehicle having a dehydrating chamber and an evaporating chamber, of means for regenerating and cooling the solution used in said dehydrating chamber comprising a regenerator, means for collecting and condensing the liberated moisture and delivering the same to said evaporating chamber, means for conducting the concentrated solution leaving said regenerator into heat transfer relationship to the dilute solution leaving the dehydrating chamber, a cooling tower, means for circulating said concentrated solution through coils in said tower counter-currently to the flow of air therethrough, means for conducting said solution into heat transfer contact with water formed from said condensed moisture and discharged through said evaporating chamber in the presence of a moving stream of fresh air, and means for conducting said solution into the top of said dehydrating chamber.

4. An air conditioning system for an aeroplane comprising an interconnected dehydrating chamber and evaporating chamber, and a cooling tower, all having forced circulation of air therethrough induced by movement of said vehicle, a continuously regenerated dehydrating solution system having forced circulation induced by pressure of evaporated moisture liberated from the regenerated solution, conduit means for the flow of liquid from said regenerated solution system through said cooling tower to said dehydrating chamber, conduit means for the flow of liquid from said dehydrating chamber to said regenerated solution system, and conduit means for the flow of condensed moisture from said regenerated solution system to said evaporating chamber.

5. A regenerative dehydrating solution cycle for an air conditioning system including a regenerator, a vapor trap, and a pressure regulator whereby regeneration of said solution results in release of liberated moisture from said solution into said vapor trap, said pressure regulator controlling forced circulation of said solution through said cycle by means of the vapor pressure existing in said vapor trap.

6. An air conditioning system for a moving vehicle utilizing a dehydrating solution for dehumidification purposes, a heater operated by the exhaust heat of the motor of said vehicle, means for conducting the dilute portion of said solution to said heater to regenerate it, means for condensing the moisture evaporated by said heater, a cooling tower for said solution provided with extending duct means for effecting circulation of air therethrough by movement of said vehicle, and means for additionally cooling said solution by absorption of heat therefrom into evaporating portions of said condensed moisture.

7. In an aeroplane, a cooling tower comprising a plurality of coils adapted to contain a regenerated dehydrating solution, an inlet for said tower extending outwardly of the body of said aeroplane for scooping air into and through said tower, and means disposed within said aeroplane for receiving the solution from said tower, said means having exterior surfaces arranged to receive moisture thereon and to permit evaporation of said moisture.

8. In an air conditioning system for a cabin-type aeroplane, a cooling tower and a dehydrating chamber disposed within the fuselage of said plane and having projecting inlet means providing for forced circulation of air therethrough by movement of said aeroplane, a heat exchanger disposed in and extending along the

lower portion of said fuselage, a regenerator disposed forwardly of said heat exchanger and exteriorly of said plane, a conduit for the flow of liquid from said regenerator through said heat exchanger and said cooling tower to said dehydrating chamber, and a conduit for the flow of liquid from said dehydrating chamber through said heat exchanger to said regenerator.

9. In combination, in the fuselage of an aeroplane, a dehydrating chamber and a cooling chamber, said dehydrating chamber having an externally projecting scoop-shaped air inlet, an air passageway between said chambers, and an air outlet from said cooling chamber into the interior of said fuselage adjacent the top thereof.

10. In combination, in the fuselage of an aeroplane, a dehydrating chamber and a cooling chamber arranged in lateral alinement in said fuselage, a sump for said cooling chamber, an after cooler disposed below said sump, perforations in the bottom wall of said sump providing for dripping of water therethrough onto said after cooler, an air passageway through said after cooler having its inlet projecting externally of said fuselage to scoop air thereinto upon movement of said aeroplane, means providing a passage for air through said dehydrating chamber, and a conduit for the flow of liquid from said cooling chamber through said after-cooler to said dehydrating chamber.

11. In an air conditioning system of the class described having a cooling chamber and a dehydrating chamber, the method of maintaining a solution employed in said dehydrating chamber cool and concentrated which comprises regenerating said solution, passing the hot regenerated solution into heat exchange contact with the dilute solution leaving said chamber, passing said regenerated solution into a cooling tower wherein air is circulated into heat exchange contact with said solution, conducting said solution from said tower through an after cooler, evaporating water from the external surface of said after cooler to effect further cooling of said regenerated solution, and delivering said regenerated cooled solution to said dehydrating chamber.

12. In an air conditioning system, the method of conditioning air which comprises forcing air into a dehydrating chamber, spraying said air with a dehydrating solution, regenerating said solution by evaporating moisture therefrom, utilizing

the pressure of the moisture vapor to effect circulation of said solution, condensing said vapor, cooling said air subsequent to dehydration thereof by evaporation of a portion of said condensed vapor, and cooling the regenerated solution by evaporation of the remaining portion of said condensed moisture.

13. In a motorized vehicle capable of moving at a relatively high rate of speed and having an enclosed passenger compartment, the method of conditioning the air for said compartment which comprises forcing air into a dehydrating chamber by movement of said vehicle, spraying said air with a dehydrating solution, regenerating said solution through evaporation of moisture therefrom by the exhaust heat of the motor of the vehicle, forcing the regenerated solution into said dehydrating chamber by the pressure of said evaporated moisture, periodically passing said moisture into a condenser cooled by movement of said vehicle, and cooling the air leaving said dehydrating chamber prior to its admission into said compartment by spraying said air with said condensed moisture.

14. The method of conditioning air for the cabin of an aeroplane which comprises precooling a dehydrating solution by counter-current contact with an air stream produced by movement of said aeroplane, forcing air into a dehumidifying chamber by movement of said aeroplane, spraying said air with the precooled dehydrating solution, evaporating from said solution moisture absorbed into said solution, and passing said moisture vapor through an air cooled condenser to condense the same.

15. An air conditioning system for a motorized vehicle having an enclosed passenger compartment, comprising a dehydrating chamber, means for spraying air forced into said chamber by movement of said vehicle with a dehydrating solution, a regenerator for said solution, means for pre-cooling the regenerated solution including an air cooling tower operated by movement of said vehicle, means for condensing the moisture vapor removed from said regenerated solution, and means for cooling the air leaving said dehydrating chamber by evaporation of said condensed moisture, said condensed moisture also being employed for further pre-cooling of said regenerated dehydrating solution.

ROBERT B. P. CRAWFORD.

CERTIFICATE OF CORRECTION.

Patent No. 2,127,993.

August 23, 1938.

ROBERT B. P. CRAWFORD.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 4, second column, line 55, claim 6, for "or" read of; and line 74, claim 8, for "sadi" read said; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 27th day of September, A. D. 1938.

Henry Van Arsdale

(Seal)

Acting Commissioner of Patents.

lower portion of said fuselage, a regenerator disposed forwardly of said heat exchanger and exteriorly of said plane, a conduit for the flow of liquid from said regenerator through said heat exchanger and said cooling tower to said dehydrating chamber, and a conduit for the flow of liquid from said dehydrating chamber through said heat exchanger to said regenerator.

9. In combination, in the fuselage of an aeroplane, a dehydrating chamber and a cooling chamber, said dehydrating chamber having an externally projecting scoop-shaped air inlet, an air passageway between said chambers, and an air outlet from said cooling chamber into the interior of said fuselage adjacent the top thereof.

10. In combination, in the fuselage of an aeroplane, a dehydrating chamber and a cooling chamber arranged in lateral alinement in said fuselage, a sump for said cooling chamber, an after cooler disposed below said sump, perforations in the bottom wall of said sump providing for dripping of water therethrough onto said after cooler, an air passageway through said after cooler having its inlet projecting externally of said fuselage to scoop air thereinto upon movement of said aeroplane, means providing a passage for air through said dehydrating chamber, and a conduit for the flow of liquid from said cooling chamber through said after-cooler to said dehydrating chamber.

11. In an air conditioning system of the class described having a cooling chamber and a dehydrating chamber, the method of maintaining a solution employed in said dehydrating chamber cool and concentrated which comprises regenerating said solution, passing the hot regenerated solution into heat exchange contact with the dilute solution leaving said chamber, passing said regenerated solution into a cooling tower wherein air is circulated into heat exchange contact with said solution, conducting said solution from said tower through an after cooler, evaporating water from the external surface of said after cooler to effect further cooling of said regenerated solution, and delivering said regenerated cooled solution to said dehydrating chamber.

12. In an air conditioning system, the method of conditioning air which comprises forcing air into a dehydrating chamber, spraying said air with a dehydrating solution, regenerating said solution by evaporating moisture therefrom, utilizing

the pressure of the moisture vapor to effect circulation of said solution, condensing said vapor, cooling said air subsequent to dehydration thereof by evaporation of a portion of said condensed vapor, and cooling the regenerated solution by evaporation of the remaining portion of said condensed moisture.

13. In a motorized vehicle capable of moving at a relatively high rate of speed and having an enclosed passenger compartment, the method of conditioning the air for said compartment which comprises forcing air into a dehydrating chamber by movement of said vehicle, spraying said air with a dehydrating solution, regenerating said solution through evaporation of moisture therefrom by the exhaust heat of the motor of the vehicle, forcing the regenerated solution into said dehydrating chamber by the pressure of said evaporated moisture, periodically passing said moisture into a condenser cooled by movement of said vehicle, and cooling the air leaving said dehydrating chamber prior to its admission into said compartment by spraying said air with said condensed moisture.

14. The method of conditioning air for the cabin of an aeroplane which comprises precooling a dehydrating solution by counter-current contact with an air stream produced by movement of said aeroplane, forcing air into a dehumidifying chamber by movement of said aeroplane, spraying said air with the precooled dehydrating solution, evaporating from said solution moisture absorbed into said solution, and passing said moisture vapor through an air cooled condenser to condense the same.

15. An air conditioning system for a motorized vehicle having an enclosed passenger compartment, comprising a dehydrating chamber, means for spraying air forced into said chamber by movement of said vehicle with a dehydrating solution, a regenerator for said solution, means for pre-cooling the regenerated solution including an air cooling tower operated by movement of said vehicle, means for condensing the moisture vapor removed from said regenerated solution, and means for cooling the air leaving said dehydrating chamber by evaporation of said condensed moisture, said condensed moisture also being employed for further pre-cooling of said regenerated dehydrating solution.

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