

June 4, 1946.

C. D. GRAHAM ET AL

2,401,560

REFRIGERATING APPARATUS

Filed Jan. 31, 1944

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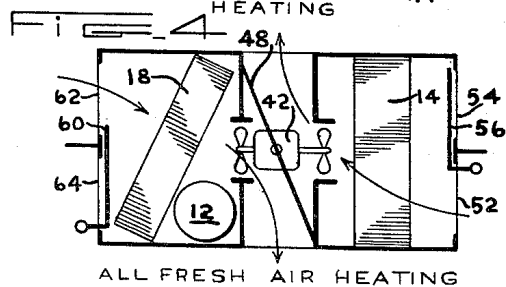
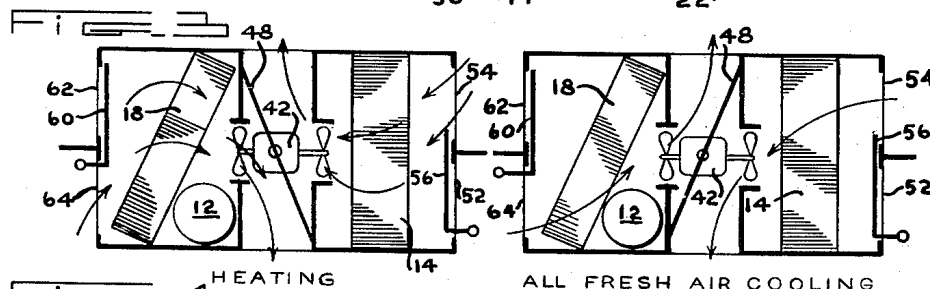
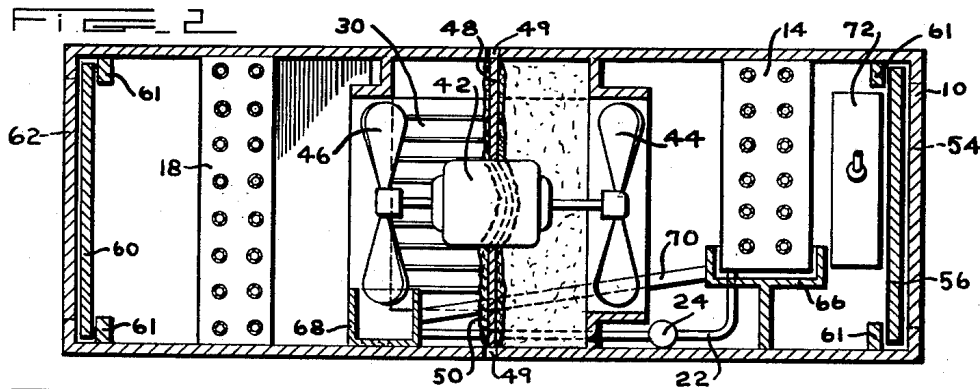
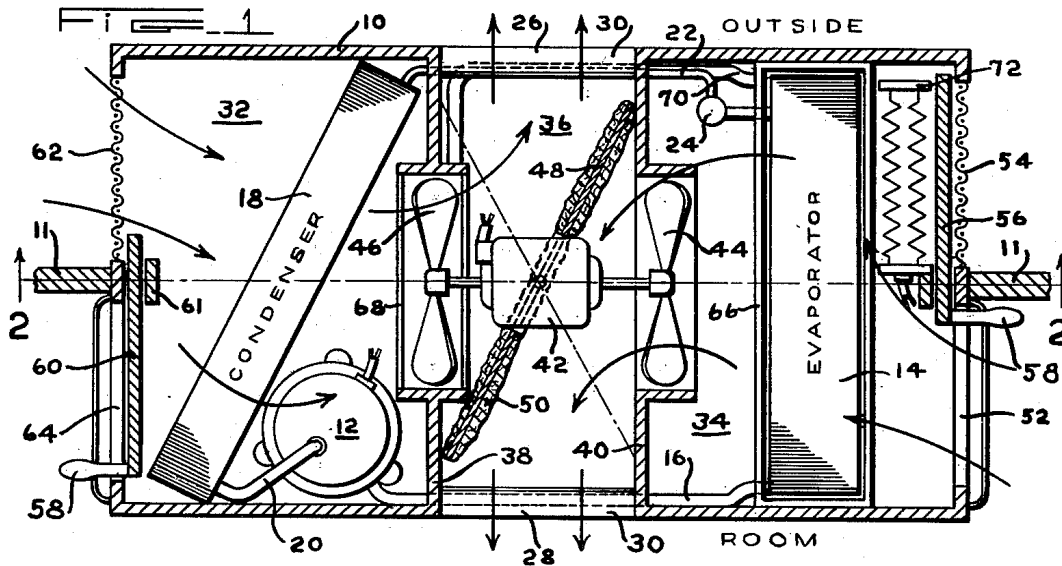


FIG. 5

INVENTORS.
CHARLES D. GRAHAM and
EDWIN S. DYBVIK.

BY
Spencer, Hardman & Fehr,
attorneys

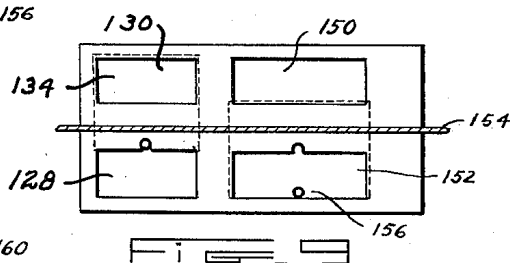
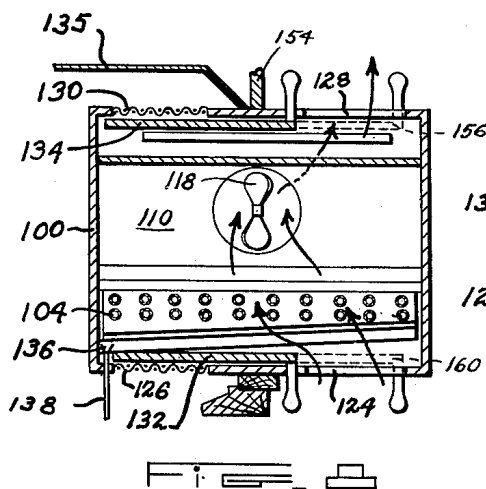
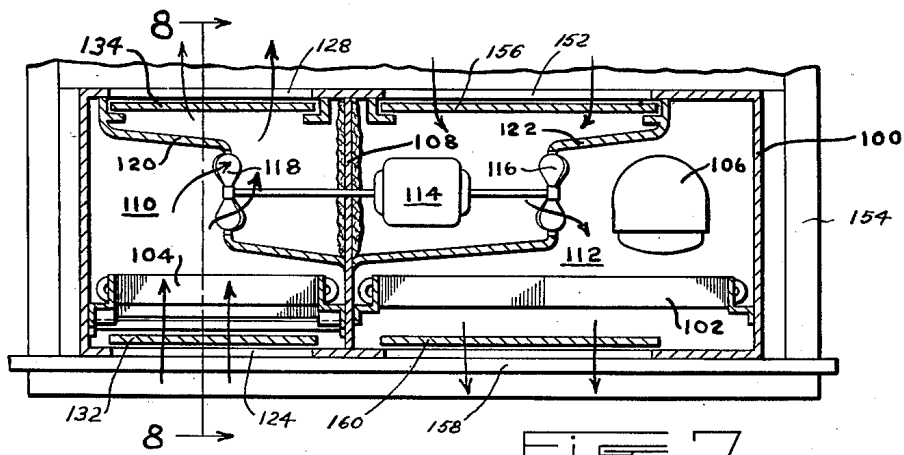
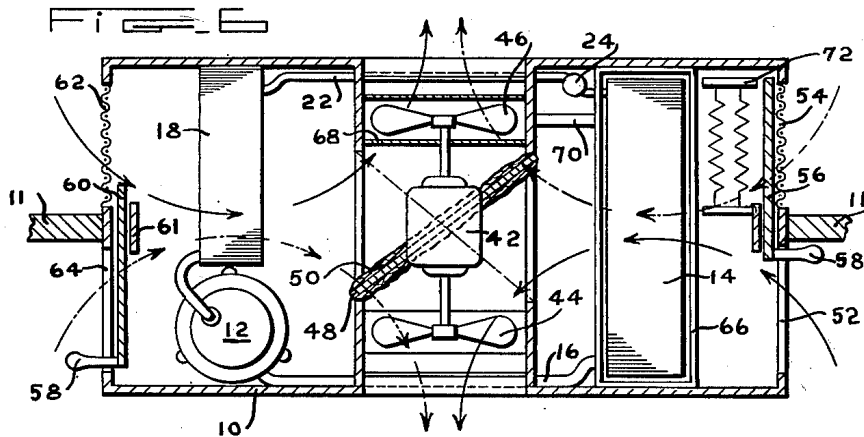
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2 Sheets-Sheet 2



INVENTORS.
CHARLES D. GRAHAM and
EDWIN S. DYBVIG.

BY
Spencer, Hardman & Felt,
attorneys

UNITED STATES PATENT OFFICE

2,401,560

REFRIGERATING APPARATUS

Charles D. Graham and Edwin S. Dybvig, Dayton,
Ohio, assignors to General Motors Corporation,
Dayton, Ohio, a corporation of Delaware

Application January 31, 1944, Serial No. 520,436

19 Claims. (Cl. 62—129)

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This invention relates to refrigerating apparatus and more particularly to an improved air conditioning unit of the self contained type.

One object of this invention is to provide a low cost reverse cycle air conditioning unit.

Another object of this invention is to provide a reverse cycle air conditioning unit which is compact enough to be mounted directly within the average size window opening.

Another object of this invention is to provide a window mounted air conditioning unit which is quiet in operation.

A further object of this invention is to provide a reverse cycle refrigerant system which includes means for preventing frosting of the evaporator during the heating cycle.

A further object of this invention is to provide an improved arrangement of inlets and outlets so as to obtain the most desirable distribution of air within the conditioned space.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings, wherein a preferred form of the present invention is clearly shown.

In the drawings:

Figure 1 is a horizontal sectional view of an air conditioning unit embodying features of my invention;

Figure 2 is a vertical sectional view taken on line 2—2 of Figure 1;

Figure 3 is a diagrammatic view somewhat similar to Figure 1 showing the arrangement of the dampers and the direction of air flow when the unit is used for heating recirculated room air;

Figure 4 is a view similar to Figure 3 showing the arrangement of the dampers when the unit is used for heating all fresh air and exhausting room air to the outside;

Figure 5 is a view similar to Figures 3 and 4 showing the arrangement of the dampers when the unit is used for cooling all fresh air and exhausting room air to the outside;

Figure 6 is a horizontal sectional view showing a slightly modified arrangement;

Figure 7 is a vertical sectional view showing another possible arrangement which may be used;

Figure 8 is a vertical sectional view taken on line 8—8 of Figure 7; and

Figure 9 is a plan view showing the arrangement of the top air inlets and outlets in a unit of the type shown in Figures 7 and 8.

Referring now to Figure 1 of the drawings, reference numeral 10 designates a casing in which a conventional volatile refrigerant system is

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mounted. This casing is adapted to be supported directly on a window sill with portions projecting in opposite directions from the wall 11 of the enclosure as shown. Reference numeral 12 designates a conventional motor compressor unit preferably of the hermetically sealed type which withdraws refrigerant vapor from an evaporator 14 through a suction line 16. The compressed refrigerant is discharged into a condenser 18 through the line 20. The condensed refrigerant is supplied to the evaporator through the liquid line 22 in which there is provided a conventional pressure reducing means 24 such as a fixed restrictor, a thermostatic expansion valve or any other type of suitable control.

The cabinet 10 is provided with a first air outlet 26 through which one stream of air is discharged into the outside atmosphere and a second air outlet 28 through which the conditioned air is discharged into the room or enclosure to be conditioned. The outlets 26 and 28 are preferably provided with adjustable louvers 30 which may be set to direct the outgoing air either upwardly or downwardly in accordance with well-known practice. By virtue of this construction, the louvers 30 provided in the conditioned air outlet 28 may be set to discharge the cooled air upwardly during the cooling cycle and may be set to discharge the heated air downwardly during the heating cycle. In order to simplify the disclosure, the construction of the louver operating means has not been shown as the details thereof form no part of this invention.

The cabinet 10 is divided into a condenser compartment 32, an evaporator compartment 34 and a plenum chamber 36 by means of the vertical partitions 38 and 40. A fan motor 42 is disposed substantially centrally within the plenum chamber 36 and is arranged to drive a first fan 44 which pulls air in over the evaporator and a second fan 46 which pulls air in over the condenser. A butterfly damper 48 is pivotally mounted in the top and bottom walls of the casing 10 by means of the pivots 49 and serves to direct the air flowing through the plenum chamber 36. The butterfly damper 48 is preferably provided with sound deadening material 50 on opposite sides thereof. In order to further reduce the amount of noise given off by the unit, the fans have been arranged so as to pull the air in over the coils and the fan blades have been located at a distance from the air outlets. The evaporator compartment is provided with a first air inlet opening 52 through which room air may be introduced into the evaporator compartment and

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a second opening 54 through which outside air may be introduced into the evaporator compartment. A slide damper 56 is provided adjacent the openings 52 and 54 so as to control the flow of air through these openings. As shown in Figure 1 the slide damper 56 is in a position in which room air only enters the evaporator compartment whereas by moving the slide 56 the fresh air inlet may be uncovered or both of the inlets may be partially uncovered. A suitable handle 58 is provided for operating the slide damper 56. A similar damper 60 is provided adjacent the condenser air inlets 62 and 64 which are provided in the end wall of the condenser compartment 32 as shown. The damper 60 makes it possible to introduce either outside air, room air, or a mixture of both into the condenser compartment. The dampers 56 and 60 are slidably mounted by means of suitable guide lugs such as the lugs 61. A condensate collecting pan 66 is provided beneath the evaporator in accordance with well-known practice. The condensate drains from the pan 66 into a receptacle 68 via the drain line 70 and is at least partially evaporated by the hot air circulated by the fan 46 and the excess condensate is atomized by the fan 46 dipping into the condensate receptacle 68.

Inasmuch as this unit is intended to be used for either heating or cooling the air for the enclosure there will be times in certain localities when the evaporator will tend to freeze condensate water thereon during the heating cycle. Thus when the outside air temperatures are low and the relative humidity of the outside air is high, the evaporator will be required to operate at a temperature low enough to freeze the condensate unless some means is provided for increasing the temperature of the air flowing over the evaporator. In the arrangement shown we have provided an electric heater 72 which is placed between the outside air inlet 54 and the evaporator 14 whereby the necessary amount of heat is introduced into the incoming air stream when required so as to permit the evaporator to be operated at a temperature high enough to avoid freezeup. The heater 72 may be manually controlled or it may be controlled automatically.

By virtue of the above described damper arrangement it is obvious that this unit may be used for either heating or cooling the air to be conditioned for the enclosure. It is also obvious that the air to be conditioned may be either recirculated room air or it may be outside air or it may be a mixture of both. Furthermore this unit may be used for purely ventilation purposes without either heating or cooling the air merely by turning off the refrigerating apparatus. By properly adjusting the dampers 56 and 60 an excess of outside air may be introduced into the room so as to maintain a positive pressure therein thereby preventing infiltration of unconditioned air. Several of the many possible air flow arrangements have been shown in Figures 1, 3, 4, and 5. Thus with the dampers arranged as shown in Figure 1, room air is circulated in over the evaporator so as to be cooled thereby and returned into the room while outside air is brought in over the condenser and is discharged into the outside atmosphere. With the dampers arranged as shown in Figure 3, room air is brought in over the condenser so as to be heated thereby and is discharged into the conditioned space whereas outside air is brought in over the evaporator so as to supply heat thereto and is then discharged into the outside atmosphere. With the dampers

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arranged as shown in Figure 4, all fresh air is brought into the condenser compartment so as to be heated by the condenser and is thereafter discharged into the room whereas a corresponding amount of room air is brought into the evaporator compartment so as to give up heat to the evaporator and is then discharged into the outside atmosphere. As pointed out hereinabove, it is not necessary to use all fresh air or all recirculated air as any mixture of the two may be circulated over either of the coils by properly adjusting the various dampers. It is also apparent that the unit may be used solely for ventilating purposes and that the amount of outside air introduced into the room through the unit or discharged from the room through the unit may be regulated by regulating the various slide dampers. By opening the inlets 52 and 64, blocking the outlet 28 by means of a cardboard or the like (not shown) and setting the damper 48 at its mid-position both fans may be used for exhausting room air to the outside atmosphere. In Figure 6 I have shown a modified arrangement in which the parts have been designated by means of the same reference numerals as used in describing the corresponding parts in Figures 1 through 5. The main difference between the arrangement shown in Figures 1 through 5 and the arrangements shown in Figure 6 is that the fan motor has been rearranged whereby the axis of the fan motor lies in a plane parallel to the faces of the evaporator and condenser coils. The location of the condenser has also been changed slightly but otherwise the apparatus and its function has not been altered.

In Figures 7, 8, and 9 I have shown somewhat diagrammatically still another modification wherein the evaporator compartment air inlets are all provided in the bottom wall of the cabinet and the evaporator compartment air outlets are all provided in the top wall of the cabinet.

Referring now to Figure 7, reference numeral 100 designates the main cabinet within which there is suitably supported a conventional refrigerating system including a condenser 102, an evaporator 104 and a motor compressor unit 106. A stationary wall which extends from the front wall of the cabinet to the back wall of the cabinet and which has been designated by the reference numeral 108 separates the cabinet into an evaporator compartment 110 and a condenser compartment 112. A fan motor 114 is provided for driving a pair of fans 116 and 118 which circulate air through the condenser compartment 112 and the evaporator compartment 110 respectively. Suitable air directing baffles 120 and 122 have been provided for directing the air through the evaporator and condenser chambers.

Referring to Figure 8 which is a sectional view taken on line 8—8 of Figure 7, it will be observed that the evaporator compartment is provided with a pair of air inlets 124 and 126 in the bottom wall of the cabinet whereby either room air or outside air may be introduced into the evaporator compartment. It will also be noted that a pair of cold air outlets 128 and 130 have been provided in the top wall of the cabinet whereby the air leaving the evaporator compartment may be discharged either into the room to be conditioned or into the outside atmosphere. The slide damper 132 may be used for controlling the source of the air introduced into the evaporator compartment. A similar damper 134 is provided for directing the air leaving the evaporator compartment. By virtue of this construction, either

fresh air, recirculated air or a mixture of both may be introduced into the evaporator compartment and the cooled air may all be discharged into the room, or into the outside atmosphere as desired.

Similar bottom inlets and top outlets are provided for the condenser compartment with the result that the apparatus may be used for either heating air for the enclosure or cooling air for the enclosure or merely ventilating the enclosure. The air flows through the condenser compartment 112 in the direction indicated by the arrows in Fig. 7. The top wall of the compartment is provided with a pair of inlets 150 and 152 located on opposite sides of the wall 154 which separates the room air from the outside air. A single slide damper 156 controls the flow of air through the inlets 150 and 152 whereby either outside air or room air may be introduced into the condenser compartment. The bottom wall of the condenser compartment is provided with a pair of similarly controlled outlet openings in vertical alignment with the top inlet openings 150 and 152 whereby the air leaving the condenser compartment may be discharged either into the room through the outlet 158 or into the outside atmosphere through a similar outlet (not shown) leading to the outside atmosphere and located directly beneath the top opening 150. Reference numeral 160 designates the damper which controls the flow of air through the condenser compartment outlets. In order to protect the top openings which are exposed to the outside atmosphere, we have provided a baffle 135 as shown in Figure 8. This baffle preferably extends the full length of the cabinet and projects slightly beyond the edge of the cabinet as shown in Fig. 8. Fig. 9 shows the baffle removed so as to expose the outlets.

The lower edges of the fins of the evaporator 104 are cut at an angle as shown in Fig. 8 whereby the condensate will drain into the trough 136 which drains into the drain pipe 138.

In order to simplify the disclosure, all of the air filters have been omitted in each of the modifications. It is within the purview of this invention, however, to provide the necessary air filters.

For purposes of disclosure, we have shown some of the most common arrangements for disposing of the condensate whereas other arrangements could be used. Thus the condensate pan 68 shown in Fig. 1 could be made large enough so as to contain the bottom portion of the condenser 18 whereby the hot gas discharged by the compressor into the bottom coils of the condenser may be used for directly heating the condensate in the pan 68. An arrangement of the type shown in the copending application Serial Number 492,849 filed January 30, 1943, may also be used for disposing of the condensate. The preferred condensate disposal arrangements are those which function to vaporize the condensate and dispose of the same into the condenser air stream whereby the condensate is discharged into the outside air during the cooling cycle and is discharged into the heated air which in turn is discharged into the enclosure to be conditioned during the heating cycle. With such an arrangement the apparatus serves to humidify the air during the heating cycle and dehumidify the air during the cooling cycle.

While the form of embodiment of the invention as herein disclosed, constitutes a preferred form, it is to be understood that other forms might be adopted, as may come within the scope of the claims which follow.

What is claimed is as follows:

1. An air conditioning unit comprising in combination, a substantially rectangular casing adapted to be positioned in a window of a room to be conditioned, the front wall and at least a portion of the sides, bottom and top of said casing being adapted to extend into the room to be conditioned; means for separating said casing into a plurality of compartments; a condenser in one of said compartments; an evaporator in another of said compartments; a compressor; refrigerant flow connections between said condenser, evaporator and compressor; a pair of air inlets for the condenser compartment, a pair of air inlets for said evaporator compartment, one of each pair of said inlets being disposed so as to introduce room air into said compartments, one of each pair of said inlets being arranged to introduce outside air into said compartments, each of said compartments being provided with air outlets, fan means for flowing air through said compartments and damper means cooperating with said inlets for selecting either room air or outside air.

2. In combination, a casing, means dividing said casing into a plurality of compartments, a condenser in one of said compartments, an evaporator in one of said compartments, said evaporator and said condenser being arranged at opposite ends of said casing, means for withdrawing refrigerant from said evaporator and for discharging compressed refrigerant into said condenser, air propelling means intermediate said condenser and said evaporator, a first outlet from said casing for discharging conditioned air into a space to be conditioned, a second outlet from said casing for discharging air to the outside atmosphere, said air propelling means comprising a pair of fans so constructed and arranged as to circulate one stream of air over said evaporator and circulate another stream of air over said condenser, and a single damper for directing the air leaving said evaporator through either one of said outlets and for directing the air leaving said condenser through the other of said outlets.

3. An air conditioning unit comprising a substantially rectangular casing adapted to be positioned in a window of a space to be conditioned, the front wall and at least a portion of the sides, bottom and top of said casing being adapted to extend into the space to be conditioned, a conditioned air outlet in the front wall of said casing, an air outlet in the back wall of said casing, means for dividing said casing into an evaporator compartment and a condenser compartment, said evaporator compartment being provided with a plurality of air inlets, one of which communicates with the outside atmosphere and another of which communicates with the inside atmosphere, said condenser compartment having a plurality of air inlets, one of which communicates with the outside atmosphere and another of which communicates with the inside atmosphere, means for controlling the amount of air entering said condenser compartment from each of said atmospheres, means for controlling the amount of air entering said evaporator compartment from each of said atmospheres, and means for selectively discharging the air from either one of said compartments into the inside atmosphere and for discharging the air from the other of said compartments into the outside atmosphere.

4. An air conditioning unit comprising a substantially rectangular casing adapted to be positioned in a window of a space to be conditioned,

the front wall and at least a portion of the sides, bottom and top of said casing being adapted to extend into the space to be conditioned, a conditioned air outlet in the front wall of said casing, an air outlet in the back wall of said casing, means for dividing said casing into an evaporator compartment and a condenser compartment, said evaporator compartment being provided with a plurality of air inlets one of which communicates with the outside atmosphere and another of which communicates with the inside atmosphere, said condenser compartment having a plurality of air inlets one of which communicates with the outside atmosphere and another of which communicates with the inside atmosphere, means for controlling the amount of air entering said condenser compartment from each of said atmospheres, means for controlling the amount of air entering said evaporator compartment from each of said atmospheres, means for selectively discharging the air from either one of said compartments into the inside atmosphere and for discharging the air from the other of said compartments into the outside atmosphere, and means for heating outside air introduced into said evaporator compartment.

5. An air conditioning unit comprising a substantially rectangular casing adapted to be positioned in a window of a space to be conditioned with one portion of said casing projecting into the outside atmosphere and another portion of said casing projecting into said space, means dividing said casing into a plurality of compartments one of which constitutes an evaporator compartment, and another of which constitutes a condenser compartment, a refrigerating system including a condenser in said condenser compartment and an evaporator in said evaporator compartment, one wall of said condenser compartment having a pair of adjacent openings one of which communicates with the space to be conditioned and the other of which communicates with the outside atmosphere, a damper movable from a position in front of one of said condenser compartment openings into a position in front of another of said condenser compartment openings, said evaporator compartment having a pair of air inlets, one of which communicates with the air in the space to be conditioned and the other of which communicates with the outside atmosphere, damper means movable from a position in front of one of said openings into a position in front of another of said openings whereby either room air, outside air or a mixture of both may be introduced into said evaporator compartment, said casing having a pair of air outlets one of which communicates with the space to be conditioned and the other of which communicates with the outside atmosphere, and damper means for directing the air leaving either one of said compartments into the space to be conditioned.

6. An air conditioning unit comprising a substantially rectangular casing adapted to be positioned in a window of a space to be conditioned with one portion of said casing projecting into the outside atmosphere, and another portion of said casing projecting into said space, means dividing said casing into a plurality of compartments, one of which constitutes an evaporator compartment and another of which constitutes a condenser compartment, a refrigerating system including a condenser in said condenser compartment and an evaporator in said evaporator compartment, one wall of said condenser compartment having a pair of adjacent

openings one of which communicates with the space to be conditioned and the other of which communicates with the outside atmosphere, a damper movable from a position in front of one of said condenser compartment openings into a position in front of another of said condenser compartment openings, said evaporator compartment having a pair of air inlets, one of which communicates with the air in the space to be conditioned and the other of which communicates with the outside atmosphere, damper means movable from a position in front of one of said openings into a position in front of another of said openings, whereby either room air or outside air may be introduced into said evaporator compartment, said casing having a pair of air outlets, one of which communicates with the space to be conditioned and the other of which communicates with the outside atmosphere, damper means for directing the air leaving either one of said compartments into the space to be conditioned, and means for heating the outside air introduced into said evaporator compartment.

7. An air conditioning unit comprising a casing adapted to be positioned in a window of a space to be conditioned, one portion of said casing projecting into the outside atmosphere and another portion of said casing projecting into the space to be conditioned, means dividing said casing into an evaporator compartment and a condenser compartment, a volatile refrigerant system including an evaporator in said evaporator compartment and a condenser in said condenser compartment, a plurality of air inlets in the bottom wall of one of said compartments, damper means slidable from a position in front of one of said inlets to a position in front of another of said inlets, means for circulating a first stream of air in thermal exchange with said condenser, means for circulating a second stream of air thermal exchange with said evaporator, means for directing one of said streams into the space to be conditioned, and means for directing the other of said streams into the outside atmosphere, one of said streams entering said casing through one of said bottom wall inlets.

8. An air conditioning unit comprising a casing adapted to be positioned in a window of a space to be conditioned, one portion of said casing projecting into the outside atmosphere and another portion of said casing projecting into the space to be conditioned, means dividing said casing into an evaporator compartment and a condenser compartment, a refrigerant system including an evaporator in said evaporator compartment and a condenser in said condenser compartment, a plurality of air inlets in the bottom wall of one of said compartments, damper means slidable from a position in front of one of said inlets to a position in front of another of said inlets, means for circulating a first stream of air in thermal exchange with said condenser, means for circulating a second stream of air thermal exchange with said evaporator, means for directing one of said streams into the space to be conditioned, means for directing the other of said streams into the outside atmosphere, said last named means comprising a plurality of air outlets and a slidable damper movable from a position in front of one of said outlets to a position in front of another of said outlets.

9. In combination a casing adapted to be mounted in a window opening with one portion projecting into the space to be conditioned and

another portion projecting into the outside atmosphere, means dividing said casing into a condenser compartment and an evaporator compartment, fan means disposed between said evaporator compartment and said condenser compartment, an evaporator in said evaporator compartment, a condenser in said condenser compartment, said fan means comprising a motor and a pair of fans disposed on opposite ends of the motor shaft, said condenser, evaporator and motor shaft being arranged in parallel relationship with one another, means for introducing a first stream of air into said evaporator compartment, means for introducing a second stream of air into said condenser compartment, and means for selectively discharging one of said streams into the space to be conditioned and for discharging the other said streams to the outside atmosphere, said last named means including a single damper operable to effect said selection.

10. In an air conditioning unit of the type adapted to be mounted on a window sill, a casing having a portion adapted to project into the outside atmosphere and another portion adapted to project into the space to be conditioned, means dividing said casing into an evaporator compartment, a condenser compartment and a damper compartment, a condenser in said condenser compartment, each of said compartments being provided with air inlet means and an air outlet, fan means for circulating air through said compartments, said outlets discharging the air into said damper compartment, said damper compartment having one air discharge opening leading to the inside, and damper means in said damper compartment for directing the flow of air through said damper compartment.

11. In an air conditioning unit of the type adapted to be mounted on a window sill, a casing having a portion adapted to project into the outside atmosphere and another portion adapted to project into the space to be conditioned, means dividing said casing into an evaporator compartment, a condenser compartment and a damper compartment, a condenser in said condenser compartment, each of said compartments being provided with air inlet means and an air outlet, fan means for circulating air through said compartments, said outlets discharging the air into said damper compartment, said damper compartment having one air discharge opening leading to the inside, and damper means in said damper compartment for directing the flow of air through said damper compartment, said fan means comprising a motor having a shaft provided with a fan on each end thereof disposed within said air outlets.

12. In an air conditioning unit of the type adapted to be mounted on a window sill, a casing having a portion adapted to project into the outside atmosphere and another portion adapted to project into the space to be conditioned, means dividing said casing into an evaporator compartment, a condenser compartment and a damper compartment, a condenser in said condenser compartment, each of said compartments being provided with air inlet means and an air outlet, fan means for circulating air through said compartments, said outlets discharging the air into said damper compartment, said damper compartment having one air discharge opening leading to the inside, and damper means in said damper compartment for directing the flow of air through said damper compartment, said fan means comprising a motor having a shaft provided with a

fan on each end thereof disposed within said air discharge openings.

13. An air conditioning unit comprising a casing adapted to be positioned in a window of a space to be conditioned with one portion of the casing adapted to project into the outside atmosphere and another portion of the casing adapted to project into said space, means dividing said casing into a plurality of compartments one of which constitutes an evaporator compartment, and another of which constitutes a condenser compartment, a refrigerating system including a condenser in said condenser compartment and an evaporator in said evaporator compartment, one wall of said condenser compartment having a pair of adjacent openings one of which is adapted to communicate with the space to be conditioned and the other of which is adapted to communicate with the atmosphere outside the said space, means for controlling the flow of air through said openings, said evaporator compartment having a pair of air inlets, one of which is adapted to communicate with the air in the space to be conditioned and the other of which is adapted to communicate with the atmosphere outside of said space, means for controlling the admission of air into said evaporator compartment through said inlets, and means for selectively discharging air from either one of said compartments into the space to be conditioned, said last named means and said openings being so constructed and arranged whereby either room air or outside air may be circulated over the condenser and discharged into the space to be conditioned.

14. An air conditioning unit comprising a casing adapted to be positioned in a wall of a space to be conditioned with one portion of said casing adapted to project into the outside atmosphere and another portion of said casing adapted to project into said space, means dividing said casing into a plurality of compartments one of which constitutes an evaporator compartment and another of which constitutes a condenser compartment, a refrigerating system including a condenser in said condenser compartment and an evaporator in said evaporator compartment, said casing having air inlet and outlet openings, air propelling means for propelling air through each of said compartments, and damper means cooperating with said openings and said air propelling means whereby air from said space may be circulated over either the condenser or the evaporator and returned to said space.

15. An air conditioning unit of the type adapted to be mounted in an opening in a wall, a casing having a portion adapted to project into the outside atmosphere and another portion adapted to project into the space to be conditioned, means dividing said casing into an evaporator compartment, a condenser compartment and a damper compartment, a condenser in said condenser compartment, an evaporator in said evaporator compartment, a refrigerant compressor for withdrawing vaporized refrigerant from said evaporator and for discharging compressed refrigerant into said condenser, means for conveying refrigerant liquefied in said condenser into said evaporator, means for circulating air through said compartments, said damper compartments having one outlet adapted to discharge air into the space to be conditioned and another outlet adapted to discharge air into the outside atmosphere, and damper means in said damper compartment for directing the flow of air from said evapora-

tor compartment through one of said damper compartment outlets and for directing condenser air out through the other of said damper compartment outlets.

16. An air conditioning unit of the type adapted to be mounted in an opening in a wall, a casing having a portion adapted to project into the outside atmosphere and another portion adapted to project into the space to be conditioned, means dividing said casing into an evaporator compartment, a condenser compartment and a damper compartment, a condenser in said condenser compartment, an evaporator in said evaporator compartment, a refrigerant compressor for withdrawing vaporized refrigerant from said evaporator and for discharging compressed refrigerant into said condenser, means for conveying refrigerant liquefied in said condenser into said evaporator, means for circulating air through said compartments, said damper compartment having one outlet adapted to discharge air into the space to be conditioned and another outlet adapted to discharge air into the outside atmosphere, and damper means in said damper compartment for directing the flow of air from said evaporator compartment out through one of said damper compartment outlets and for directing condenser air out through the other of said damper compartment outlets, said evaporator, condenser, and damper compartments being arranged in horizontal alignment.

17. An air conditioning unit of the type adapted to be mounted in an opening in a wall, a casing having a portion adapted to project into the outside atmosphere and another portion adapted to project into the space to be conditioned, means dividing said casing into an evaporator compartment, a condenser compartment and a damper compartment, a condenser in said condenser compartment, an evaporator in said evaporator compartment, a refrigerant compressor for withdrawing vaporized refrigerant from said evaporator and for discharging compressed refrigerant into said condenser, means for conveying refrigerant liquefied in said condenser into said evaporator, means for circulating air through said compartments, said damper compartment having one outlet adapted to discharge air into the space to be conditioned and another outlet adapted to discharge air into the outside atmosphere, and damper means in said damper compartment for directing the flow of air from said evaporator compartment out through one of said damper compartment outlets and for directing condenser air out through the other of said damper compartment outlets, said evaporator, condenser, and damper compartments being arranged in horizontal alignment with each

compartment projecting on opposite sides of said wall.

18. In an air conditioning unit of the type adapted to be mounted in an opening in a wall, a casing having a portion adapted to project into the outside atmosphere and another portion adapted to project into the space to be conditioned, means dividing said casing into an evaporator compartment, a condenser compartment and a damper compartment, a condenser in said condenser compartment, an evaporator in said evaporator compartment, a refrigerant compressor withdrawing vaporized refrigerant from said evaporator and for discharging compressed refrigerant into said condenser, means for conveying refrigerant liquefied in said condenser into said evaporator, means for circulating air through said compartments, said damper compartment having one outlet adapted to discharge air into the space to be conditioned and another outlet adapted to discharge air into the outside atmosphere, and damper means in said damper compartment for directing the flow of air from said evaporator compartment out through one of said damper compartment outlets and for directing condenser air out through the other of said damper compartment outlets, said damper compartment being disposed substantially between said evaporator and condenser compartments.

19. An air conditioning unit comprising a casing adapted to be positioned in a window of a space to be conditioned, the front wall and at least a portion of the sides, bottom and top of said casing being adapted to extend into the space to be conditioned, a conditioned air outlet in one wall of said casing, an air outlet in another wall of said casing, means for dividing said casing into an evaporator compartment and a condenser compartment, said evaporator compartment being provided with air inlet means adapted to communicate with either the outside atmosphere or the inside atmosphere, said condenser compartment having air inlet means for introducing air into the condenser compartment from either the outside atmosphere or the inside atmosphere, means for controlling the amount of air entering said condenser compartment from each of said atmospheres, means for controlling the amount of air entering said evaporator compartment from each of said atmospheres, means for selectively discharging the air from either one of said compartments into the inside atmosphere and for discharging the air from the other of said compartments into the outside atmosphere, and means for heating outside air introduced into said evaporator compartment.

CHARLES D. GRAHAM.
EDWIN S. DYBVIG.