Feb. 9, 1943. J. L. DITZLER 2,310,843

AIR CONDITIONING APPARATUS

Filed June 20, 1941

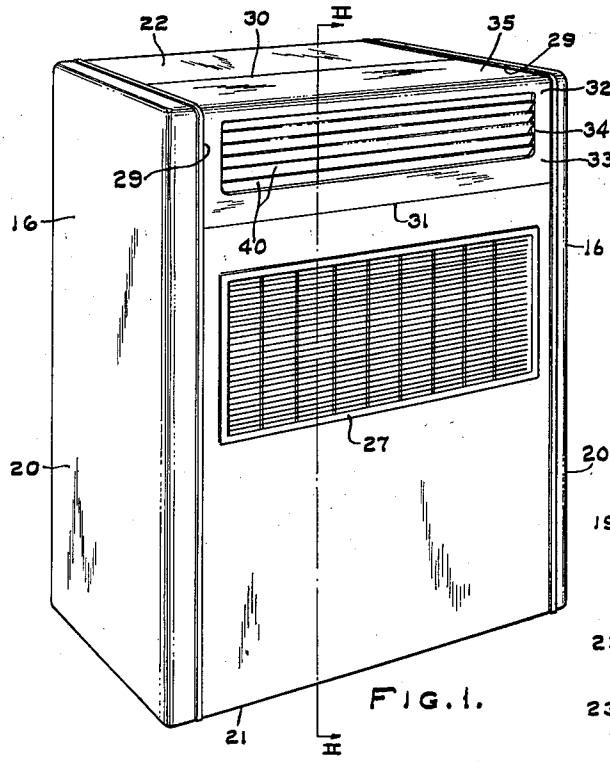


FIG. 1.

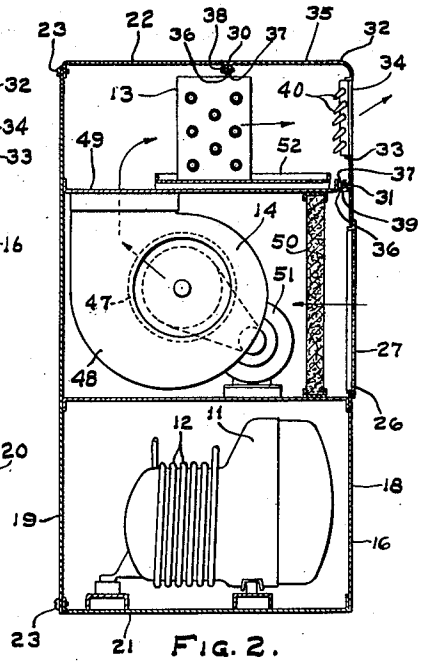


FIG. 2.

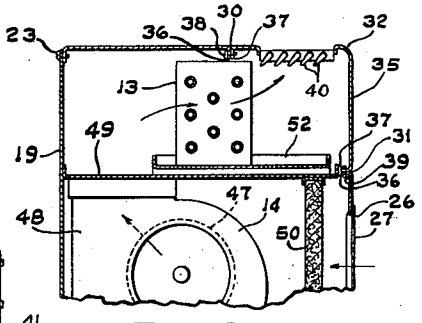


FIG. 3.

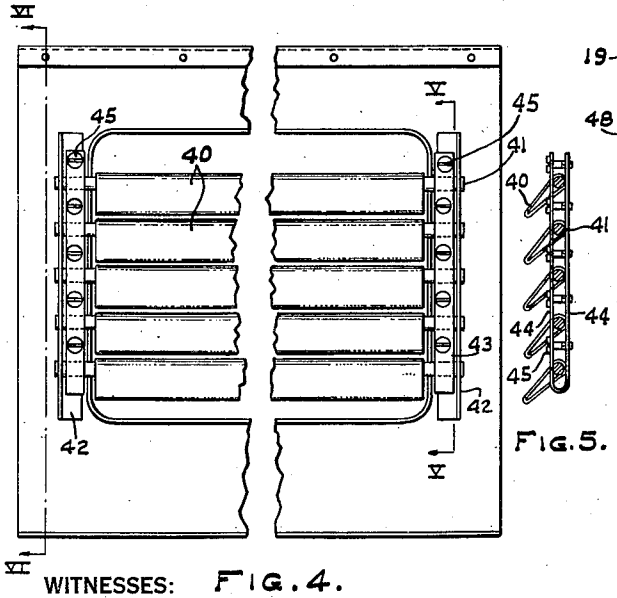


FIG. 4.

FIG. 5.

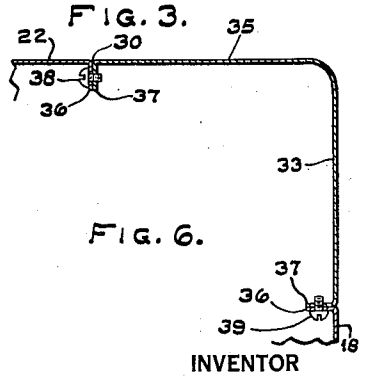


FIG. 6.

WITNESSES:

F. E. Browder

E. H. Lutz

INVENTOR

JOHN L. DITZLER

BY Wasteyn

ATTORNEY

Patented Feb. 9, 1943

2,310,843

UNITED STATES PATENT OFFICE

2,310,843

AIR CONDITIONING APPARATUS

John L. Ditzler, Springfield, Mass., assignor to Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., a corporation of Pennsylvania

Application June 20, 1941, Serial No. 398,869

7 Claims. (Cl. 62—129)

This invention relates to air conditioning apparatus, more particularly to an air conditioning unit adapted to be disposed in the enclosure to be air conditioned, and it has for an object to provide improved apparatus of this type.

A further object is to provide an air conditioning unit having an improved arrangement which permits the conditioned air to be selectively discharged from the apparatus in either one of two general directions.

A still further object is to provide air conditioning unit having an improved and simple arrangement which permits the conditioned air to be discharged from the front of the unit or from the top of the unit.

These and other objects are effected by my invention as will be apparent from the following description and claims taken in accordance with the accompanying drawing, forming a part of this application, in which:

Fig. 1 is a perspective view of a self-contained package type air conditioning unit embodying the invention;

Fig. 2 is a vertical section taken along line II—II of Fig. 1 showing the outlet in position for discharging the conditioned air from the front of the unit;

Fig. 3 is a partial vertical section similar to Fig. 2 but showing the outlet in position for discharging the conditioned air from the top of the unit;

Fig. 4 is a detail of of the outlet through which the conditioned air is discharged;

Fig. 5 is a view taken approximately along line V—V of Fig. 4;

Fig. 6 is a detail view taken along line VI—VI of Fig. 4 showing how the corner piece is attached to the cabinet.

Referring specifically to the drawing, Fig. 1 shows a self-contained package-type air conditioning unit embodying the present invention. This unit includes a compressor 11, a condenser 12, and an evaporator 13 which are connected so as to provide a conventional refrigerating system. A blower 14 is provided for circulating air to be conditioned or cooled over the evaporator 13. The refrigerating system and the blower 14 are enclosed in a substantially rectangular cabinet 16.

The cabinet 16 is defined by a vertical front wall 18, a vertical rear wall 19, a pair of vertical side walls 20, a horizontal bottom wall 21, and a horizontal top wall 22. The rear wall 19 is removably attached to the cabinet by screws 23. The front wall 18 has an air inlet opening 26 therein. A grill 27 is removably positioned in the opening 26. A corner of the cabinet 16 is cut away along line 30 in the top wall 22 and along the line 31 in the front wall 18 and along lines 29 at the sides of the cabinet so as to provide substantially equal sized adjoining openings in the top wall 22 and the front wall 18. A separate reversible corner piece 32 is provided having equal sized substantially right angular portions 33 and 34 to extend across and fit the openings provided by cutting away the corner of the cabinet. The portion 33 of the corner piece has an air outlet opening 34 therein and the portion 35 is imperforate so as to close the opening that it extends across.

The corner piece 32 may be mounted as shown in Fig. 2, to discharge the air forwardly, in which case the portion 33 extends across the opening in the front wall and the imperforate portion 35 closes the opening in the top wall. The corner piece may also be reversed and attached in the position shown in Fig. 3 to discharge the air upwardly. In this case, the portion 33 having the outlet opening extends across the opening in the top wall and the imperforate portion 35 closes the opening in the front wall.

Suitable provision is made for detachably retaining the corner piece 32 on the cabinet in either one of the above-mentioned positions. For example, there may be provided, as shown on the drawing, flanges 36 on the cabinet and flanges 37 on the corner piece 32, and screws 38 and 39 which extend through holes in the flanges 36 and are screw-threaded into holes in the flanges 37. The screw openings in the several flanges are preferably all similarly placed; that is, the openings in each of the flanges 37 are in alignment with the openings in each of the flanges 36, so that the same openings may be used for both positions of the reversible corner piece. Access is had to the screws 38 by removing the rear wall 19 from the cabinet and access is had to the screws 39 by removing the grill 27 from the air inlet opening 26.

A plurality of individually, manually, adjustable louvers 40 extend across the air outlet opening 34. These louvers permit selective control of the direction of flow of the air discharged through the outlet opening 34. They are mounted by means of trunnions 41 which extend from each end of the respective louvers. These trunnions are pivotally carried in holes in angle irons 42 which are attached to the corner piece adjacent two opposite sides of the air outlet opening 34. As seen from Figs. 4 and 5 all of the trunnions on

the corresponding ends of the respective louvers 40 lie in substantially the same vertical plane. A hairpin-shaped member 43 having resilient legs 44 is provided for applying friction to the trunnions 41 to hold the louvers 40 in adjusted positions. The legs 44 of the members 43 extend adjacent two opposite sides of all of the trunnions 41 on the corresponding ends of the respective louvers and are held in frictional engagement with the trunnions by screws 45. In order to assure good frictional contact between each of the trunnions 41 and the legs 44, a screw 45 is provided between each pair of adjacent trunnions 41. The screws 45 are accessible for adjusting when the corner piece 32 is off the cabinet.

The compressor 11 is mounted in the lower portion of the cabinet 16. This compressor is the conventional reciprocating pump type and has the condenser 12 wrapped around the body of the same.

The blower 14 is mounted in the central portion of the cabinet substantially opposite the air inlet opening 26. The blower 14 includes a blower wheel 47 and housing 48 having a discharge opening 49. As seen from the drawing, this discharge opening is located rearwardly in the cabinet 16 so that the air discharged therefrom is forced through the evaporator 13 from the rear thereof. An electric motor 51 is provided for driving the blower wheel 47 through a belt or some other suitable power transmitting means. A filter 50 is located between the air inlet opening 26 and the inlet to the blower 14.

The evaporator 13 is located in the upper portion of the cabinet 16 and is supported on a pan 52 which serves to catch and drain away the condensate from the evaporator. This evaporator is preferably of the conventional cross fin serpentine coil type and it is positioned rearwardly from the openings provided in the cabinet by cutting away the corner of the same. The reason for so positioning the evaporator is to assure that substantially all of the air that passes through said openings must pass through and in contact with substantially all of the evaporator 13.

During the operation of the unit, air is drawn in through the air inlet opening 26 and the filter 50 by the blower wheel 47 and is forced through the blower housing 48, along the path indicated by the arrows in Figs. 2 and 3, through the evaporator 13 and out through the openings in the corner of the cabinet 16. If the corner piece 32 is in the position shown in Fig. 2, the air will be discharged from the front of the cabinet 16. If the corner piece 32 is in the position shown in Fig. 3, the air will be discharged from the top of the cabinet 16.

Self-contained package-type air conditioning units are usually installed either on the floor or up against the ceiling of a room. If the unit is installed on the floor, a top discharge is desired. If the unit is installed up against the ceiling, a front discharge is desired. Heretofore, in order to provide units for floor installation and ceiling installation, two separate models have been provided, that is, one model having a top discharge for floor installation and one model having a front discharge for up against the ceiling installation. An advantage of the unit provided by this invention is that it may be installed either on the floor or up against the ceiling. If the unit is installed up against the ceiling, the corner piece 32 is positioned on the cabinet 16 as shown in Fig. 2 with the discharge opening at the front of the cabinet. If the unit is installed on the floor, the corner piece 32 is positioned on the cabinet 16 as shown in Fig. 3 with the discharge opening at the top of the cabinet.

Although, this invention has been described in connection with cooling apparatus, it will be understood that it might be used equally as well with heating apparatus, that is, with a cabinet having a heating coil therein in place of the evaporator 13.

From the foregoing description taken in connection with the drawing, it is seen that this invention has provided improved air conditioning apparatus of the self-contained package type improved arrangement which permits the conditioned air to be selectively discharged from the apparatus in either one of two general directions.

While I have shown my invention in several forms, it will be obvious to those skilled in the art that it is not so limited, but is susceptible of various other changes and modifications without departing from the spirit thereof, and I desire, therefore, that only such limitations shall be placed thereupon as are specifically set forth in the appended claims.

What I claim is:

1. In an air conditioning unit, the combination of an evaporator, a blower for circulating air over said evaporator, a substantially rectangular cabinet enclosing said evaporator and said blower, said cabinet having substantially equal sized adjoining openings in the front and top sides thereof, said openings being on the discharge side of said evaporator, a separate substantially right angular corner piece including an imperforate portion and a portion having an air discharge opening therein, said portions of said corner piece being substantially equal in size and corresponding approximately in size to said openings in said cabinet, means for retaining said corner piece in first and second positions on said cabinet, said first position being such that the imperforate portion closes the opening in the top of the cabinet and the portion having the discharge opening therein is adjacent the opening in the front of the cabinet so as to cause the air passed over the evaporator to be discharged from the front of the cabinet, said second position being such that the imperforate portion closes the opening in the front of the cabinet and the portion having the discharge opening therein is adjacent the opening in the top of the cabinet so as to cause the air passed over the evaporator to be discharged from the top of the cabinet.

2. In a self-contained air conditioning unit, the combination of a refrigeration system including a compressor, a condenser, and an evaporator; a blower for circulating air over said evaporator; a substantially rectangular cabinet enclosing said refrigeration system and said blower, an opening in the front side of said cabinet through which air is drawn by said blower and forced through said evaporator from the rear thereof, adjoining openings in the front and top sides of said cabinet through which the air passed over said evaporator is discharged from said cabinet, said evaporator being located rearwardly from said openings so that substantially all of the air discharged through said openings must pass through said evaporator, a separate substantially right-angular corner piece including an imperforate portion and a portion having an air discharge opening therein, means for detachably re-

taining said corner piece in position on said cabinet with the imperforate portion closing the opening in the top of the cabinet and with the portion having the discharge opening therein adjacent the opening in the front of the cabinet to cause the air passed over said evaporator to be discharged from the front of the cabinet, said corner portion being reversible on said cabinet, and means for detachably retaining said corner portion in position on said cabinet with the imperforate portion closing the opening in the front of the cabinet and with the portion having the discharge opening therein adjacent the opening in the top of the cabinet to cause the air passed over the evaporator to be discharged from the top of the cabinet.

3. In an air conditioning unit, the combination of a refrigeration system including an evaporator, a blower for circulating air over said evaporator, a substantially rectangular cabinet enclosing said refrigeration system and said blower, said cabinet having adjoining openings in the front and top sides thereof, said openings being on the discharge side of said evaporator, a separate substantially right-angular corner piece including an imperforate portion and a portion having an air discharge opening therein, individually adjustable louvers extending across said air discharge opening for permitting selective control of the direction of flow of air passing through said opening, said louvers being mounted by means of trunnions extending from their respective ends, all of the trunnions on the corresponding ends of the respective louvers lying in substantially the same plane, resilient members extending adjacent to two sides of said trunnions near the ends of said louvers, means clamping said resilient members into engagement with said trunnions to frictionally hold said louvers in adjusted position, means for retaining said corner piece in first and second positions on said cabinet, said first position being such that the imperforate portion closes the opening in the top of the cabinet and the portion having the discharge opening therein is adjacent the opening in the front of the cabinet so as to cause the air passed over the evaporator to be discharged from the front of the cabinet, said second position being such that the imperforate portion closes the opening in the front of the cabinet and the portion having the discharge opening therein is adjacent the opening in the top of the cabinet so as to cause the air passed over the evaporator to be discharged from the top of the cabinet.

4. In an air conditioning unit, the combination of a refrigeration system including an evaporator, a blower for circulating air over said evaporator, a substantially rectangular cabinet enclosing said refrigeration system and said blower, said cabinet having adjoining openings in the front and top sides thereof, said openings being on the discharge side of said evaporator, a separate substantially right angular corner piece including an imperforate portion and a portion having an air discharge opening therein, individually adjustable louvers extending across said air discharge opening for permitting selective control of flow of air through said opening, said louvers being mounted by means of trunnions extending from their respective ends, all of the trunnions on the corresponding ends of the respective louvers lying substantially in the same plane, resilient members extending adjacent to two sides of said trunnions near the ends of said louvers, screws extending between each pair of adjacent trunnions and engaging said resilient members for clamping said resilient members into engagement with said trunnions to frictionally hold said louvers in adjusted position, means retaining said corner piece in first and second positions on said cabinet, said first position being such that the imperforate portion closes the opening in the top of the cabinet and the portion having the discharge opening therein is adjacent the opening in the front of the cabinet so as to cause the air passed over the evaporator to be discharged from the front of the cabinet, said second position being such that the imperforate portion closes the opening in the front of the cabinet and the portion having the discharge opening therein is adjacent the opening in the top of the cabinet so as to cause the air passed over the evaporator to be discharged from the top of the cabinet.

5. In an air conditioning unit, the combination of a temperature changing element, a blower for circulating air over said temperature changing element, a substantially rectangular cabinet enclosing said temperature changing element and said blower, said cabinet having substantially equal sized adjoining openings in the front and top sides thereof, said openings being on the discharge side of said temperature changing element, a separate substantially right-angular corner piece including an imperforate portion and a portion having an air discharge opening therein, means for retaining said corner piece in first and second positions on said cabinet, said first position being such that the imperforate portion closes the opening in the top of the cabinet and the portion having the discharge opening therein is adjacent the opening in the front of the cabinet so as to cause the air passed over the temperature-changing element to be discharged from the front of the cabinet, said second position being such that the imperforate portion closes the opening in the front of the cabinet and the portion having the discharge opening therein is adjacent the opening in the top of the cabinet so as to cause the air passed over the temperature changing element to be discharged from the top of the cabinet.

6. In an air conditioning unit, the combination of a refrigeration system including an evaporator, a blower for circulating air over said evaporator, a substantially rectangular cabinet enclosing said refrigeration system and said blower, said cabinet having a removable back wall and an air inlet opening in its front wall, said air inlet opening having a removable grill positioned therein, said cabinet having substantially equal sized adjoining openings in the front and top sides thereof, said openings being on the discharge side of said evaporator, a separate substantially right-angular corner piece including an imperforate portion and a portion having an air discharge opening therein, said portions of said corner piece being substantially equal in size and corresponding approximately in size to said openings in said cabinet, means for detachably securing said corner piece in first and second positions on said cabinet, said securing means being made accessible for manipulation by removing the back wall from said cabinet and by removing the grill from said inlet opening, said first position being such that the imperforate portion closes the opening in the top of the cabinet and the portion having the discharge opening therein is adjacent the opening in the side of the cabinet so that the air passed over said evaporator is caused to be

discharged from the front of the cabinet, said second position being such that the imperforate portion closes the opening on the side of the cabinet and the portion having the discharge openings therein is adjacent the opening in the top of the cabinet so as to cause the air passed over the evaporator to be discharged from the top of the cabinet.

7. In an air conditioning unit, the combination of a cabinet having walls on two adjacent sides disposed at an angle to each other and having an opening in adjacent portions of said two sides, an angular corner member for said opening comprising a louvered part disposed in and extending across the portion of said opening in one of said sides and comprising another part forming a closure for the portion of said opening in the other of said sides, said corner member being reversible to place the louvered part in either portion of the opening and the other part in the other portion of the opening.

JOHN L. DITZLER.