Oct. 14, 1969 A. C. KOENIG 3,472,044

AIR FLOW CONTROL FOR AN AIR CONDITIONER

Filed Jan. 19, 1968 2 Sheets-Sheet 1

FIG. 1

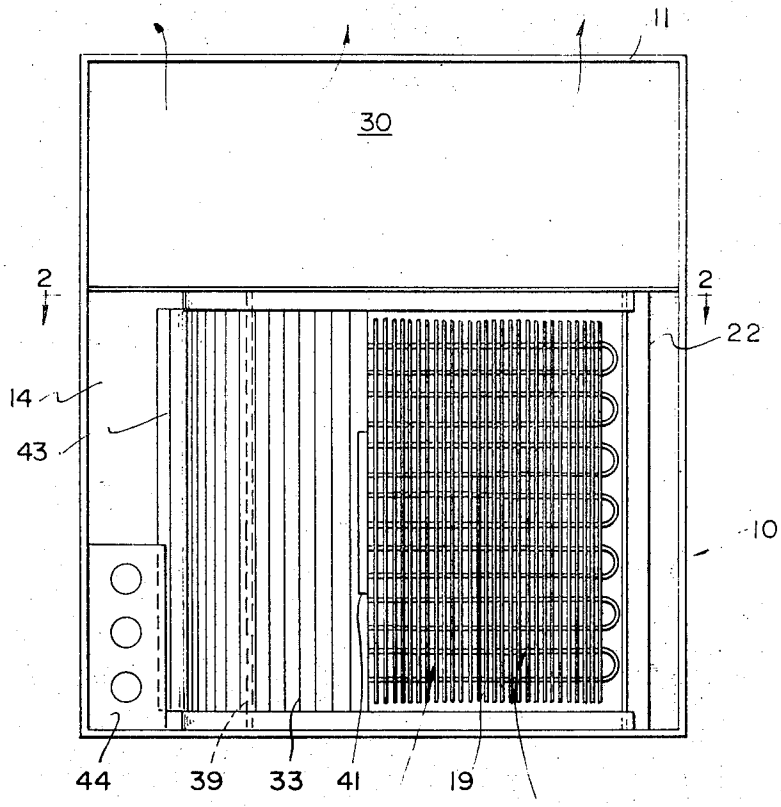


FIG. 7

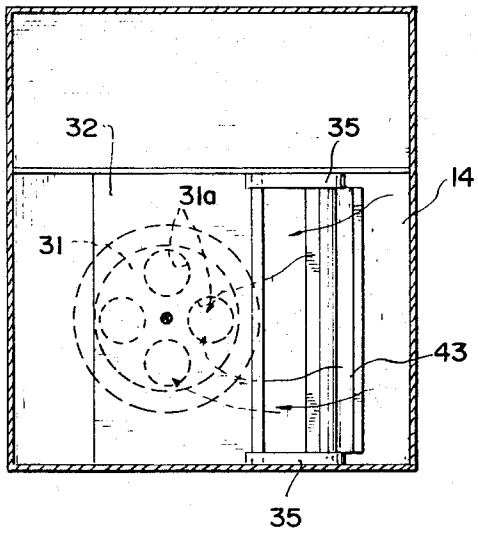
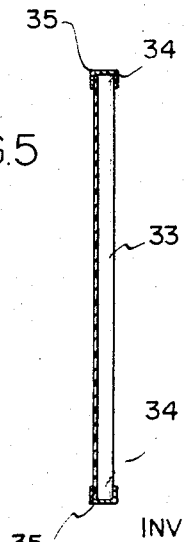


FIG. 5



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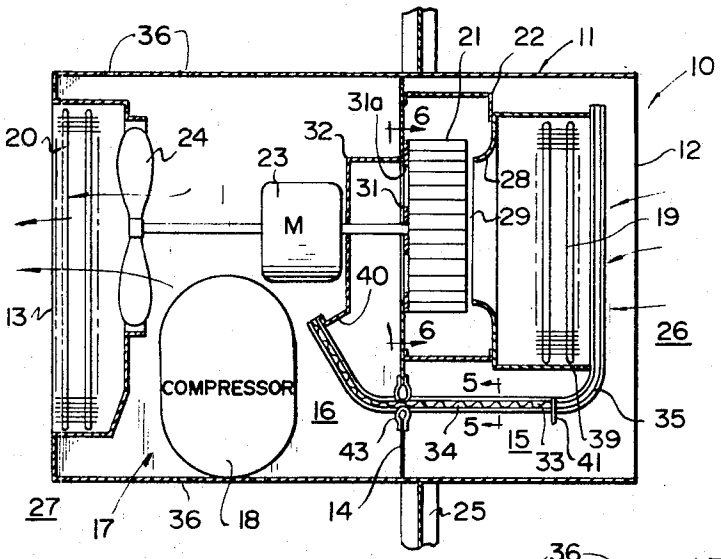


FIG.2

FIG.3

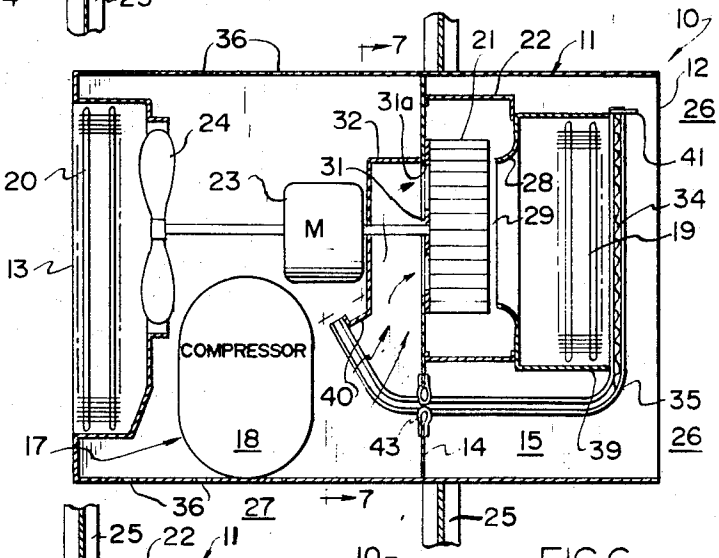


FIG.4

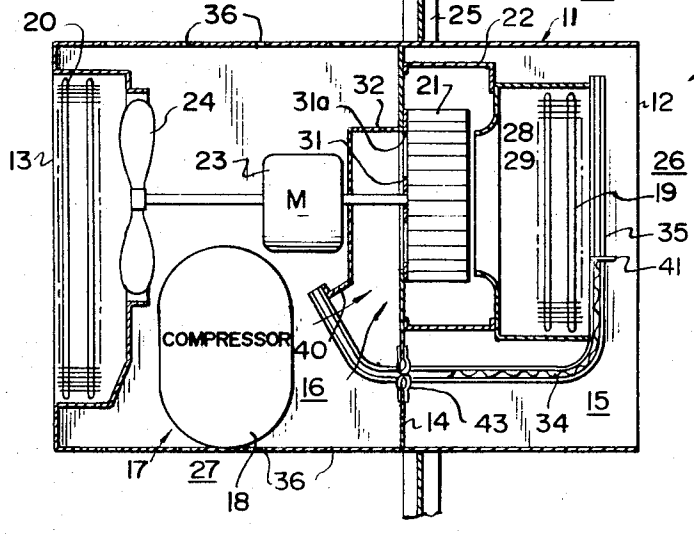
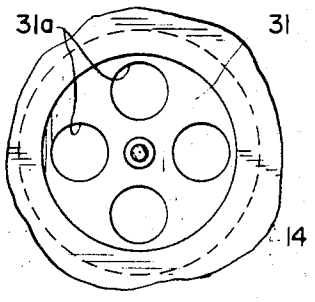


FIG.6



United States Patent Office 3,472,044
Patented Oct. 14, 1969

3,472,044

AIR FLOW CONTROL FOR AN AIR CONDITIONER

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Filed Jan. 19, 1968, Ser. No. 699,202
Int. Cl. F25d 17/06, 23/12
U.S. Cl. 62—408 8 Claims

ABSTRACT OF THE DISCLOSURE

A room air conditioner having a cabinet with a blower mounted therein for blowing air into a room. An air flow control curtain is provided for selectively causing the blower to draw air through an evapartor to provide refrigerated air to the room, or from the outside to deliver outside air to the room. The curtain is provided with manual adjusting means for providing variable control of the curtain.

This invention relates to air conditioners and in particular to room air conditioners.

In a conventional room air conditioner, the air conditioning apparatus is contained within a housing having a front portion confronting the room to be conditioned and a rear portion confronting the outside of the room. In normal air cooling operation, the room air is passed through a heat exchanger, such as an evaporator, in the front portion of the cabinet, and then discharged by means of a blower back into the room. At times, however, it has been found desirable to provide fresh air to the room as from outside of the room by means of the air conditioner and, thus, air conditioners have been developed having a plurality of dampers and blowers for selectively providing such functioning. An excellent example of such an air conditioner is that shown in U.S. Letters Patent No. 3,182,899, issued to W. A. Hames, Jr., et al. on May 11, 1965, and owned by the assignee hereof.

The present invention comprehends an improved simplified air conditioner structure providing such desirable selective refrigerated air circulation and outside air delivery. Thus, a principal feature of the present invention is the provision of a new and improved air conditioner.

Another feature of the invention is the provision of such an air conditioner having new and improved means for controlling air flow therethrough to provide selectively refrigerated air recirculation and fresh air delivery.

A further feature of the invention is the provision of such an air conditioner having a new and improved simplified and low cost structure for providing such selective air flow control.

Still another feature of the invention is the provision of such an air conditioner having a cabinet defining a front and a rear, air cooling means in the cabinet, and means in the cabinet for discharging air to the front of the cabinet, means for controlling air flow to the discharging means comprising means defining a first flow path from the front of the cabinet through the air cooling means to the discharging means, mean defining a second flow path from the rear of the cabinet to the discharging means, curtain means, and means for guilding the curtain means from a first position blocking the first flow path to a second position blocking the second flow path.

A yet further feature of the invention is the provision of such an air conditioner further including exothermic heat transfer means in the cabinet at the rear, and means for flowing air from the rear of the cabinet in a third flow path in heat exchange relationship with the exothermic heat transfer means and outwardly to the rear of the cabinet, the second flow path having a portion thereof upstream of the discharging means common with a portion of the third flow path.

Still another feature of the invention is the provision of such an air conditioner wherein the curtain has a length preselected to permit a first portion thereof to partially block the first flow path and a second portion thereof to concurrently partially block the second flow path.

A yet further feature of the invention is the provision of such an air conditioner wherein the discharging means comprises a blower having a first inlet and an opposite, second inlet, and the first flow path is through the first inlet to the blower and the second path is through the second inlet to the blower.

Yet another feature of the invention is the provision of such an air conditioner air flow control curtain having a new and improved construction.

A still further feature of the invention is the provision of such an air conditioner having a new and improved blower construction for providing selective air flow control.

Other features and advantages of the invention will be apparent from the following description taken in connection with the accompanying drawing wherein:

FIGURE 1 is a front elevation of an air conditioner with the front grill removed showing an air flow control curtain in a partially open position;

FIGURE 2 is a sectional view of the air conditioner taken along line 2—2 of FIGURE 1 and having the air flow control means of the invention arranged for refrigerated circulation of the room air;

FIGURE 3 is a view similar to that of FIGURE 2, but with the air flow control means arranged for delivering outside air into the room;

FIGURE 4 is a view similar to FIGURE 2, but with the air flow control means arranged to provide partial refrigerated recirculation of the room air and partial delivery of fresh air to the room;

FIGURE 5 is a vertical section of the air flow control means taken substantially along the line 5—5 of FIGURE 2;

FIGURE 6 is a fragmentary vertical section taken substantially along the line 6—6 of FIGURE 2; and

FIGURE 7 is a fragmentary vertical section taken substantially along the line 7—7 of FIGURE 3.

In the exemplary embodiment of the invention as disclosed in the drawing, an air conditioner generally designated 10 is shown to comprise a cabinet 11 having a front 12 and a rear 13. The interior of the cabinet is divided transversely by a center wall 14 to define a front space, or compartment, 15, and a rear compartment 16. Refrigeration apparatus generally designated 17 is provided within cabinet 11 and includes a compressor 18 in rear space 16, an evaporator 19 in front space 15, and a condenser 20 in rear space 16. As is obvious to those skilled in the art, the refrigeration apparatus functions to provide an endothermic heat exchange in the evaporator 19, and an exothermic heat exchange in the condenser 20, whereby air flowed through the evaporator 19 is cooled and the heat energy withdrawn therefrom is exhausted from the air conditioner by means of outside air flow through the condenser. The air flow through the evaporator is effected by a blower or the like 21 disposed within a suitable shroud 22 and driven by a suitable electric motor 23. The air flow through the condenser is effected by a suitable fan 24.

The cabinet 11 is arranged to be disposed in a wall such as wall 25, with the front 12 confronting a room space 26 and the rear 13 confronting an outside space 27.

Shroud 22 defines an inlet 28 for conducting the air from the evaporator 19 to an open face 29 of the blower 21. The blower discharges the air through a discharge duct 30, see FIGURE 1, through the front 12 of the cabinet for recirculation of the refrigerated air to the room space 26.

Conventionally, the rear face of the blower used in such air conditioning apparatus is closed. In the present apparatus **10**, however, the rear face **31** is provided with perforations **31***a* as shown in FIGURE 6 and the dividing wall **14** is provided with a duct portion **32** for conducting air from space **16** through the perforate face **31** to the blower **21** for discharge through the duct **30** to the room space **26**. Air enters the space **16** through openings **36** provided in the side walls of cabinet **11**.

Control of the air flow in apparatus **10** is effected by means of a curtain **33** having its opposite side edges **34** (FIGURE 5) received in opposite confronting channels **35** for sliding movement between a rearward position, as shown in FIGURE 2, and a forward position, as shown in FIGURE 3. More specifically, the channels **35** have a J-shaped configuration as shown in FIGURES 2–4. The evaporator **19** is enclosed in a suitable housing **39** with the channels **35** extending adjacent the side edges thereof.

In normal operation of the air conditioner which may be regulated by a suitable conventional control **44**, the curtain **33** is retracted to the position of FIGURE 2 by means of a manual handle **41** to extend across an inlet **40**, defined by the housing duct portion **32**, thereby closing the second flow path through the rear wall **31** of the blower and leaving unobstructed the flow path from the front **12** through the evaporator **19** to the blower **21**. Thus, as shown in FIGURE 2, the air conditioner apparatus functions to recirculate refrigerated air to the room space **26** in the normal manner. Concurrently, the fan **24** circulates air through the condenser **20** for removing the heat energy withdrawn from the room air to the outside.

When the curtain **33** is repositioned to the disposition shown in FIGURE 3, the first flow path of the room air through the vaporator **19** to the blower **21** is blocked by the curtain. At the same time, the inlet **40** is open to permit air flow in a second flow path from the outside space **27** through the perforate wall **31** to the blower **21** for delivering the outside air through the discharge duct **30** into the room space **26**.

As shown in FIGURES 1 and 4, the curtain **33** may be positioned in an intermediate disposition partially obstructing the flow path to the evaporator **19** while leaving the flow path through the inlet **40** to the rear of the blower **21** at least partially open, thereby to provide a mixing of fresh outside air with the refrigerated recirculated room air.

The curtain **33** may be formed of any suitable material permitting facilitated sliding movement thereof selectively to the different control positions illustrated in FIGURES 1 through 3. Illustratively, the curtain may be formed of a flexible plastic sheet material or may be formed of a plurality of strips extending between the channels **35** and suitably interconnected to form an effective flow control wall element.

As shown, the dividing wall **14** may be provided with suitable seals **43** to preclude leakage of air from rear space **16** to front space **15**. Further the cabinet **11** may be suitably fitted in the wall **25** to prevent air movement between spaces **26** and **27** about the cabinet.

As shown in FIGURE 3, when the air flow through the blower is through the second path; i.e., from outside space **27** to the blower through inlet **40**, the air effectively bypasses the condenser **20** and, thus, is substantially free of heat transfer association with the air conditioner apparatus, thereby providing substantially unaltered outside air to the room space.

Thus, air conditioner apparatus **10** comprises an improved air conditioner apparatus having simplified and economical means for effecting selective control of the air flow either in a recirculated, refrigerated path or in an alternative fresh air supply path from the outside space to the room. The improved air flow control means further permits a substantially infinite control over a proportioned delivery of recirculated refrigerated air and outside air by facilitated adjustment of the curtain **33** when desired.

While I have shown and described one embodiment of my invention, it is to be understood that it is capable of many modifications. Changes, therefore, in the construction and arrangement may be made without departing from the spirit and scope of the invention as defined in the appended claims.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. In an air conditioner having a cabinet defining a front and a rear, and heat exchanger means in said cabinet, means for controlling air flow through said air conditioner comprising: means in said cabinet for discharging air to the front of said cabinet; means defining a first flow path from the front of the cabinet, through said heat exchanger means to said discharging means; means defining a second flow path from the rear of the cabinet to said discharging means; curtain means; and means for alternatively disposing said curtain means to cause the air flow to be alternatively through said first or second flow paths to discharge only to the front of said cabinet, said disposing means disposing said curtain means alternatively in a first position blocking said first flow path or in a second position blocking said second flow path.

2. The air conditioner means of claim **1** wherein said air discharging means comprises a blower having a first inlet and an opposite, second inlet, and said first flow path is through said first inlet to said blower and said second path is through said second inlet to said blower.

3. In an air conditioner having a cabinet defining a front and a rear, air cooling means in said cabinet, and means in said cabinet for discharging air to the front of said cabinet, means for controlling air flow to said discharging means comprising: means defining a first flow path from the front of the cabinet through said air cooling means to said discharging means; means defining a second flow path from the rear of the cabinet to said discharging means; curtain means; and means for guiding said curtain means from a first position blocking said first flow path to a second position blocking said second flow path, said curtain comprising a plurality of laterally connected parallel strips.

4. In an air conditioner having a cabinet defining a front and a rear, air cooling means in said cabinet, and means in said cabinet for discharging air to the front of said cabinet, means for controlling air flow to said discharging means comprising: means defining a first flow path from the front of the cabinet through said air cooling means to said discharging means; means defining a second flow path from the rear of the cabinet to said discharging means; curtain means; and means for guiding said curtain means from a first position blocking said first flow path to a second position blocking said second flow path, said air discharging means comprising a blower having a perforated face and said second flow path extending through said perforated face to said blower.

5. In an air conditioner having a cabinet defining a front and a rear, air cooling means in said cabinet, and means in said cabinet for discharging air to the front of said cabinet, means for controlling air flow to said discharging means comprising: means defining a first flow path from the front of the cabinet through said air cooling means to said discharging means; means defining a second flow path from the rear of the cabinet to said discharging means; curtain means; means for guiding said curtain means from a first position blocking said first flow path to a second position blocking said second flow path; heat transfer means in the cabinet at said rear; and means for flowing air from the rear of the cabinet in a third flow path in heat exchange relationship with said heat transfer means and outwardly to the rear of the cabinet,

said second flow path having a portion thereof upstream of said discharging means common with a portion of said third flow path.

6. The air conditioner means of claim 5 wherein said portion of said second flow path comprises an inlet portion thereof.

7. The air conditioner means of claim 1 wherein said disposing means further selectively disposes the curtain to have a first portion thereof partially block said first flow path and a second portion thereof concurrently partially block said second flow path.

8. The air conditioner means of claim 7 wherein said curtain portions comprise opposite end portions thereof.

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WILLIAM J. WYE, Primary Examiner

U.S. Cl. X.R.

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