

Feb. 7, 1961

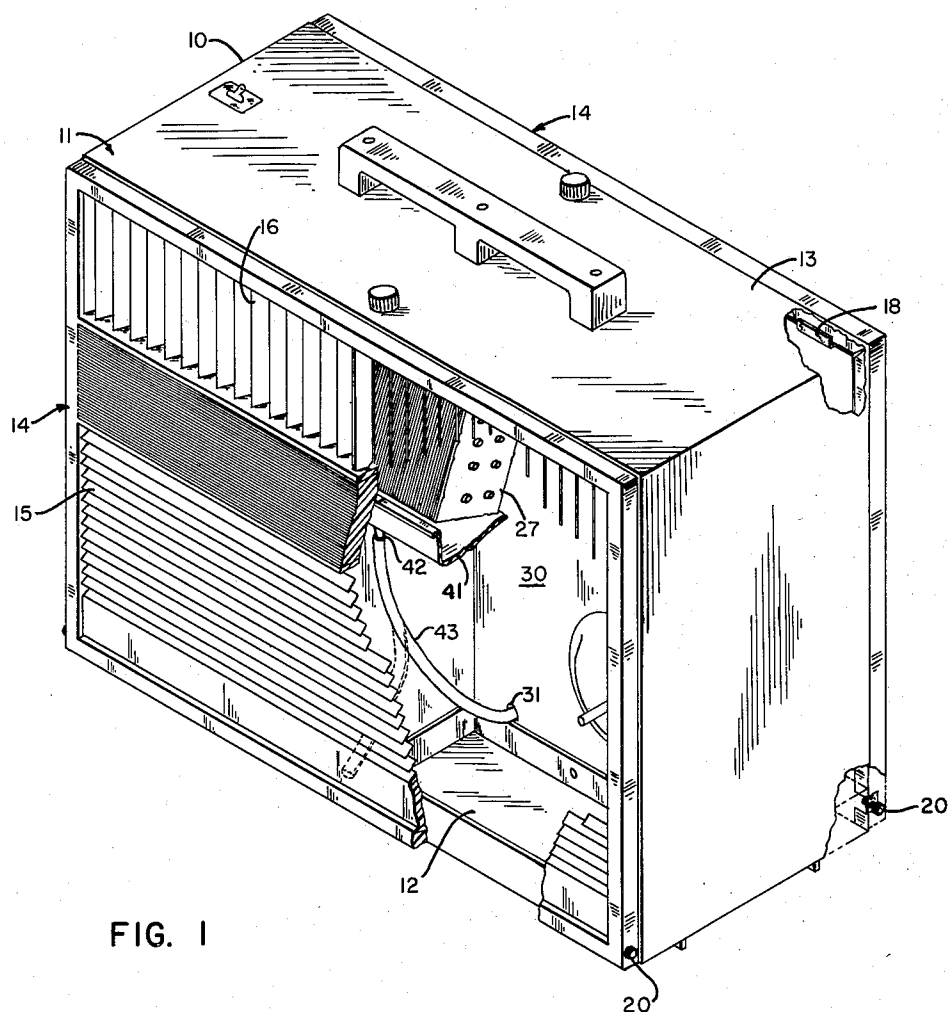
D. E. MacLEOD ET AL

2,970,457

SELF-CONTAINED AIR CONDITIONING UNIT

Filed Sept. 22, 1958

2 Sheets-Sheet 1



INVENTOR.
David Carlo MacLeod &
Francis De Haven Stevens
BY Herman Seid
Atty.

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D. E. MacLEOD ET AL

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FIG. 3

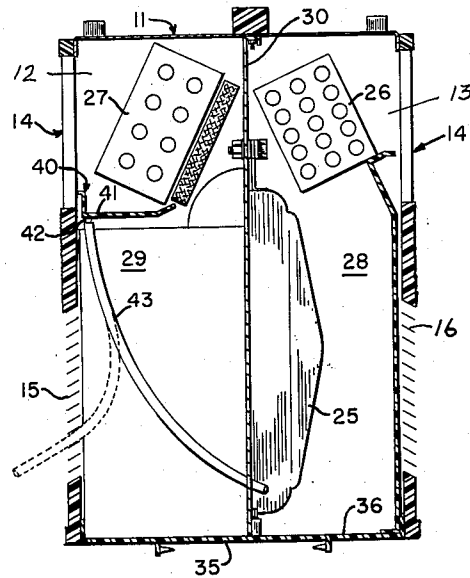
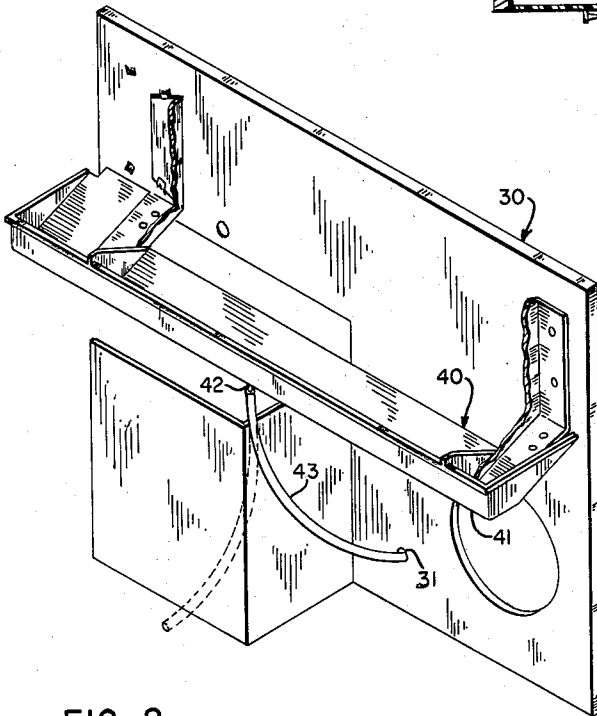


FIG. 2

INVENTOR.
David Earle MacLeod &
Francis De Haven Stevens
BY
Herman Seid
Atty.

1

2,970,457

SELF-CONTAINED AIR CONDITIONING UNIT

David Earle MacLeod and Francis De Haven Stevens,
Syracuse, N.Y., assignors to Carrier Corporation, Syracuse, N.Y., a corporation of Delaware

Filed Sept. 22, 1958, Ser. No. 762,303

1 Claim. (Cl. 62—279)

This invention relates to air conditioning, more particularly to means facilitating the use of an air conditioning unit alternatively for cooling-heating purposes or for dehumidification purposes, and to means for selectively directing the flow of condensate accumulating on the cooling element of an air conditioning apparatus.

Air conditioning units generally comprise a casing containing: a compressor, heat dissipating condenser, and heat absorbing evaporator, all arranged in a closed fluid circuit through which refrigerant is passed. If air from the conditioned area is directed into heat exchange relationship with the evaporator coils, this air will be cooled; if the air is directed into heat exchange relationship with the condenser coil, the air will be heated; if both the condenser and the evaporator are in heat exchange relationship with the conditioned area, the condenser will raise the temperature of the air in the conditioned area to lower the relative humidity thereof, and the evaporator coil will condense the moisture, with a resultant dehumidification of the air. Where the unit is employed as a cooler, any condensate accumulated on the evaporator will be passed to the condenser to be dissipated into the ambient. Where the unit is employed as a heater, depending on conditions, it may or may not be desirable to direct the condensate to the condenser. Where the unit is employed as a dehumidifier, it is clearly undesirable to direct the condensate to the condenser since this will merely serve to return any moisture condensed out by the evaporator to the conditioned area. Thus, where a single unit is employed alternatively as a heater-cooler or a dehumidifier, it is desirable to be able to selectively direct the flow of condensate from said evaporator.

It is with the above desideratum in mind that the present means have been evolved, means providing for selective direction of the condensate from the evaporator coil either to the condenser where the heat given off by the condenser will evaporate the condensate, or to some other collection point. The ability to selectively direct the condensate permits a single unit to be employed either as a cooler, heater, or dehumidifier.

It is accordingly a primary object of this invention to provide an improved air conditioning unit.

Another object of the invention is to provide an air conditioning unit which may function alternatively as a cooler-heater or as a dehumidifier.

It is also an object of this invention to provide novel means for collecting any condensate forming on the evaporator cooling element of the unit.

A still further object of the invention is to provide a novel air conditioning unit with means for selectively directing the condensate forming on the evaporator to any point as desired.

Another important object of the invention is to permit the user of an air conditioning unit to control flow of condensate forming on the evaporator so that the unit may function alternatively as a cooler-heater or dehumidifier.

A still further object of the invention is to provide a

2

novel facade grill for an air conditioner which will permit selective delivery of the condensate.

It is also an object of this invention to provide novel means separating the heat dissipating element from the heat absorbing element of an air conditioning unit, said means permitting selective direction of condensate forming on the surface of the cooling element to the heat dissipating element.

These and other objects of the invention which will be made hereinafter more apparent are achieved by providing a conventional air conditioning apparatus which normally has a condenser chamber containing a heat dissipating condenser, and an evaporator chamber containing a heat absorbing evaporator, said chamber separated by a common partition wall extending therebetween. Within the evaporator chamber mounted beneath the evaporator coil, novel condensate collection means in the form of a condensate drain trough is provided to catch any condensate accumulating on the evaporator. Selectively directable condensate discharge means including a flexible conduit is extended from a low point of the condensate trough, and this conduit is thereafter removably positioned in an aperture in the partition wall. Where, as here disclosed, the teachings of the invention are applied to an air conditioning unit having all of the components of the unit self contained within a housing, it is proposed to provide means whereby the condensate conduit may be selectively positioned with its free end either extending either through the partition wall into the condenser chamber, or out of the unit through a novel evaporator facade grill. The novel evaporator facade grill and condenser facade grill are identical and interchangeable so as to simplify manufacture, and further to permit the unit to be arranged with either or both facades facing the conditioned area with equal aesthetic effect.

A primary feature of the invention resides in the provision in an air conditioning apparatus of a flexible condensate discharge tube or conduit which may be selectively positioned so as to permit condensate dissipation by the condenser where the unit is employed for cooling; or to permit condensate collection where the unit is employed for dehumidification purposes. When heating is desired, depending on humidity conditions in the conditioned area, the condensate may either be independently collected, discharged to the ambient, or distributed in the conditioned area.

Another feature of the invention resides in the provision in an air conditioning apparatus of a novel partition panel through which a condensate drain tube may be removably passed, said panel functioning to separate the condenser from the evaporator in the air conditioning apparatus.

An additional feature of the invention resides in the provision of a novel condensate drain trough for use in collecting condensate from the evaporator of air conditioning apparatus without interfering with air flow.

A further important feature of the invention resides in the provision of an air conditioner unit construction with novel identical facade grills arranged on each side of the unit whereby either the condenser or evaporator side of the unit may be exposed to the conditioned area with equal aesthetic effect.

The specific details of one embodiment of the invention, and its mode of functioning will be made most manifest and particularly pointed out in conjunction with the accompanying drawings, wherein:

Figure 1 represents a perspective view of a novel air conditioning unit constructed in accordance with the teachings of this invention, with parts broken away to reveal some of the novel features of the invention;

Figure 2 is a perspective partial detail view of the

novel condensate drain trough shown mounted on the novel panel of the unit of Figure 1; and

Figure 3 is a sectional view showing the alternative positions of the condensate discharge conduit.

Referring now more particularly to the drawings, like numerals in the various figures will be employed to designate like parts.

As best seen in Figure 1 the novel air conditioning unit 10 here presented as embodying the instant invention comprises a casing 11 having an evaporator side 12 (the near side in the figure) and a condenser side 13.

A facade grill 14 is provided having intake louvres 15 extending horizontally across the bottom part of the grill, and exhaust louvres 16 extending vertically along the upper part of the grill 14. Two of these facade grills 14 are employed in conjunction with each unit 10, one grill employed as a condenser facade grill, and the other as an evaporator facade grill. Each grill is held in position on casing 11 by means of spaced tabs 18 formed along the upper edge of grill 14, and adapted to engage with a flange on the edge of casing 11. The lower edge of the facade grill 14 is provided with thumb screws 20 which are adapted to be turned into engagement with casing 11.

Within the casing, a refrigeration system comprising a compressor 25 shown schematically in Figure 3, a heat dissipating condenser 26, and heat absorbing evaporator 27, all arranged in a closed refrigerant circuit, is provided. Evaporator 27 is arranged to extend along one side of casing 11, and condenser 26 extends along the opposite side of casing 11, supported by suitable brackets on partition panel 30.

Partition panel 30 is arranged within casing 11 to extend between evaporator 27 and condenser 26 so as to form a separate condenser chamber 28 and evaporator chamber 29 within casing 11. Partition panel 30 is formed with an aperture 31 for a purpose to be made hereinafter more apparent. Base pan 35 forms the bottom of casing 11 and provides a condensate sump 36 in condenser chamber 28.

Extended beneath evaporator 27, and supported by partition panel 30, at a spaced distance therefrom, a condensate drain trough 40 is arranged. Trough 40 is formed with a lowermost point 41 from which a spigot 42 is extended. Selectively directable condensate discharge means in the form of condensate discharge conduit 43, formed of a flexible material such as rubber, vinyl plastic, or the like is coupled to said spigot 42, and the free end of condensate discharge tube 43 is extended either through aperture 31 in panel 30 (as shown by the solid line in Figures 1, 2 and 3), or through the intake louvres 15 of grill 14 over the evaporator side of the unit, as shown by the dotted line in Figures 1 and 3.

The afore disclosed air conditioning unit embodying the novel features of this invention permits selective use of the unit to provide either heating, cooling, or dehumidifying of the air in any given conditioned area. This flexibility of use is attained as a result of the ability to selectively control the discharge of any condensate accumulating on the evaporator cooling element of the unit.

Where it is desired to employ unit 10 for cooling the air in any given area, the unit is positioned in a window, or otherwise arranged with the evaporator 27 in heat exchange relationship with the air in the conditioned area, and condenser 26 in heat exchange relationship with the ambient. This is most readily accomplished by positioning the unit 10 on a window stool with the evaporator side facing the room. For cooling operation it is generally desirable to lower the moisture content or humidity of the air in the conditioned area. This is accomplished by directing the condensate, which normally accumulates on the evaporator surface, and drains into condensate trough 40, out of the conditioned area.

When condensate discharge tube 43 is extended through aperture 31 in panel 30, the condensate in trough 40 will naturally flow to low point 41, through spigot 42, through discharge tube 43 into condensate sump 36 in condenser chamber 28. Here the heat dissipated by condenser 26 will serve to evaporate the condensate. Though not here illustrated it is proposed to employ a conventional condenser fan having a condensate slinger ring thereon for directing air into heat exchange relationship with condenser 26, and for picking the condensate up from the sump 36 and discharging the condensate against the condenser.

Where it is desired to warm the air in the conditioned area, the novel unit 10 may be employed for this purpose by reversing the position of the unit so that condenser 26 is in heat exchange relationship with the air in the conditioned area, and evaporator 27 is in heat exchange relationship with the ambient. In this orientation the heat given off by condenser 26 will be directed to the conditioned area. Depending on the humidity conditions in the conditioned area, the condensate collecting in trough 40 may either be directed to the conditioned area by extending condensate discharge tube 43 into communication with sump 36 or the condensate may be returned to the ambient by positioning tube 43 through louvres 15 as shown by dotted line in Figures 1 and 3. Where so positioned, tube 43 serves to direct the collected condensate out to the ambient. It should of course be noted that during the normal heating season, humidity conditions are generally too low in the average home, so that it would be desirable to direct the condensate into the condenser sump for distribution to the conditioned area.

Unit 10 may also efficiently be employed as a dehumidifier in areas of excessive humidity such as basements, wash rooms, or the like. This is accomplished by positioning unit 10 entirely within the area to be dehumidified, so that both the condenser and evaporator are in heat exchange relationship with the air in the area to be dehumidified. Condensate drain tube 43 is then positioned in the dotted line position shown in Figures 1 and 3, and a suitable fluid container is arranged to receive any condensate discharged by the tube. In this position, the condenser serves to raise the temperature of the air thus decreasing the relative humidity thereof, and evaporator 27 serves to condense moisture from the air, serving to decrease the absolute humidity thereof. It will be appreciated that the high level take-off of condensate can drain in a pan which sets at the same level as the unit.

It is thus seen that a novel air conditioning unit has been provided, and a novel mode of functioning thereof whereby the unit may be employed to either selectively heat, cool, or dehumidify the air in any given area. This is accomplished by provision of novel means for the collection of any condensate accumulating on the cooling element of the unit, and novel means for selectively discharging the condensate either to the ambient, to the conditioned area, or to some separate collection point. The novel unit is provided with novel facade grills, identical in appearance, one on each side thereof whereby the unit may be turned with either side facing the conditioned area with equal aesthetic effect and which provide an inexpensive arrangement without detracting from the aesthetic effect.

The above disclosure has been given by way of illustration and elucidation and not by way of limitation and it is desired to protect all embodiments of the hereindisclosed inventive concept within the scope of the appended claim.

We claim:

An air conditioning unit of the window mounted type comprising an evaporator, a compressor, a condenser, means forming an apertured enclosure for said unit, a partition separating said evaporator and said condenser to form an evaporator chamber and a condenser cham-

5

ber, said partition having an opening therein, means for supplying separate streams of air over the evaporator and condenser, means for mounting said unit in a window whereby either the evaporator or condenser may be placed in heat transfer relation with air within the area served by the unit, means placed beneath said evaporator for collecting condensate draining from said evaporator, flexible conduit means extending in said evaporator compartment, said flexible conduit means having a first end fixedly connected to said condensate collection means, the body of said conduit means extending through said evaporator compartment and terminating in a free end removably extending through said partition opening for delivering condensate to a predetermined position within the condenser compartment, said free end being removable 15

6

from said partition opening upon dismounting said unit from the window for the purpose of employing the unit as a dehumidifier so that the body extends in the opposite direction through one of said enclosure apertures to discharge condensate through the free end outside said unit.

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