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W. B. TOPER ETAL
AIR CONDITIONING UNIT

3,299,796

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2 Sheets-Sheet 1

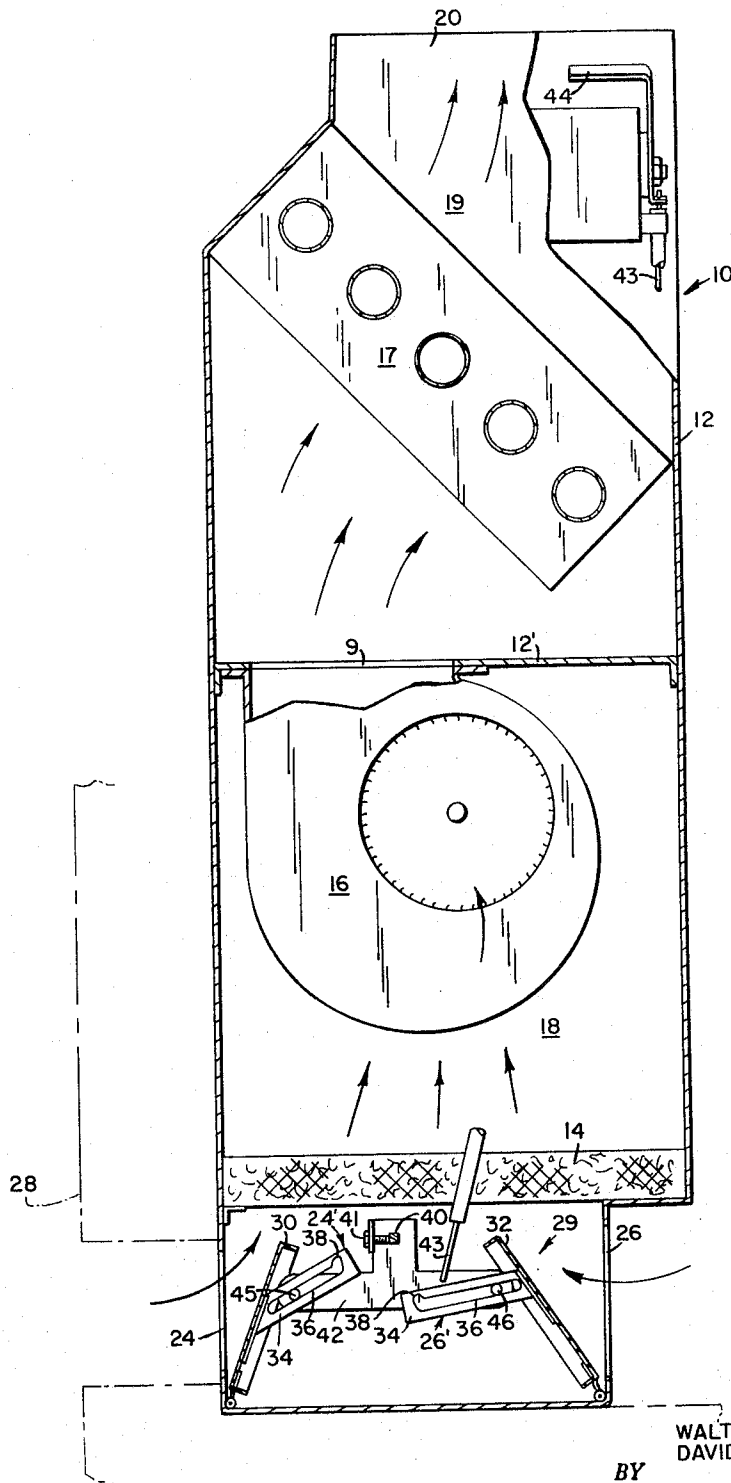


FIG. 1

INVENTORS.
WALTER B. TOPER.
DAVID F. BRYANS.
BY *Harry K. Lantz, Jr.*
ATTORNEY.

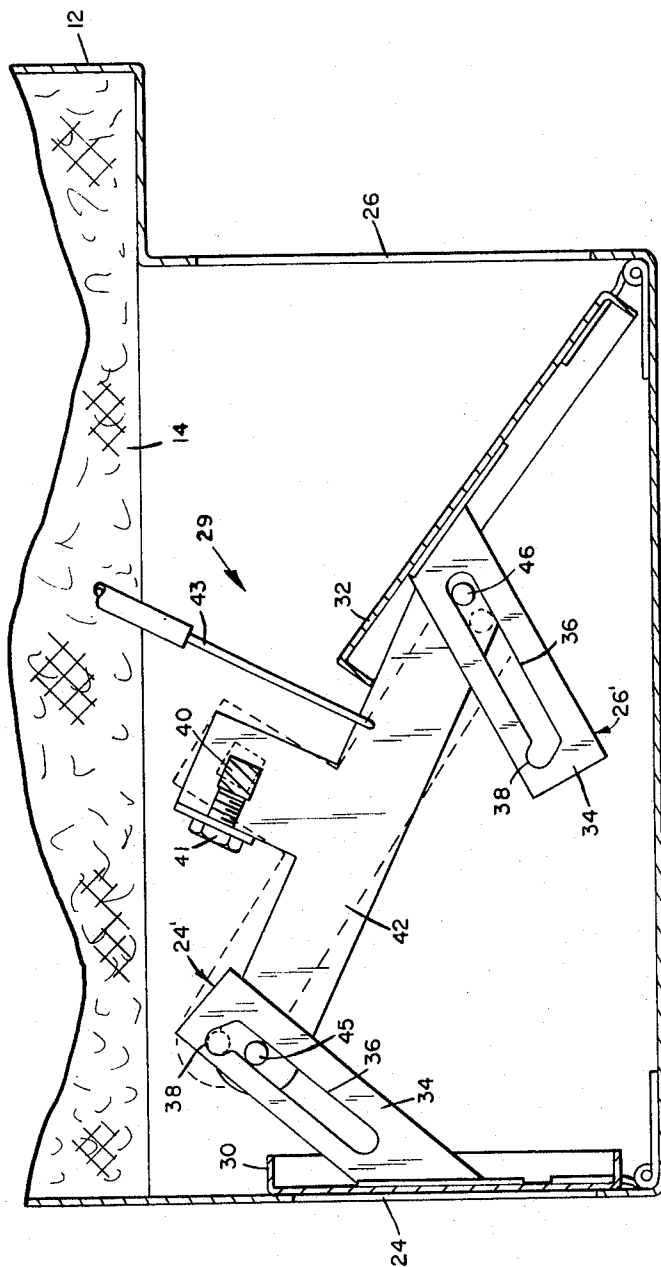
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INVENTORS.
WALTER B. TOPER.
DAVID F. BRYANS.
BY *Henry C. Martin, Jr.*
ATTORNEY.

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3,299,796

AIR CONDITIONING UNIT

Walter B. Toper and David F. Bryans, Syracuse, N.Y.,
assignors to Carrier Corporation, Syracuse, N.Y., a
corporation of Delaware

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4 Claims. (Cl. 98-36)

This invention relates to room air conditioners, and more particularly, to a room air conditioner including improved damper means for regulating the respective quantities of room air and fresh air to be circulated in the area being treated.

Fan coil units are frequently employed with central station cooling and heating apparatus for conditioning multi-room buildings. Such units may include a fan, a heat exchange coil through which a stream of air to be treated is directed by the fan in heat exchange relation with a medium passing through the coil and damper means for determining the respective quantities of room air and fresh air comprising the stream of air directed through the heat exchange coil.

The chief object of this invention is to provide an air conditioner including improved damper control means for varying the respective quantities of room air and fresh air drawn into the unit.

An object is to provide an air conditioning unit adapted to treat mixed streams of room air and fresh air which includes novel damper means providing positive opening, closing, and locking of the fresh air damper.

This invention relates to room air conditioning units having an enclosure containing a fresh air inlet, a room air inlet and a common discharge outlet. Preferably, the inlets are oppositely disposed. The openings of each of the inlets is regulated by a damper, the dampers being interconnected. The dampers are so connected that they work inversely to each other; that is, as one damper begins to open, the second damper begins to move toward closed position and vice versa. A lever is connected to a control arm interposed between the dampers by a control wire. The lever has enough friction to hold the two dampers in any position from 100% fresh air and 0% room air to 100% room air and 0% fresh air. Upon movement of the lever into either 100% position, one damper is closed securely and the control arm locks that damper in closed position.

The attached drawings illustrate a preferred embodiment of the invention, in which

FIGURE 1 is a sectional view of an air conditioning unit, embodying the invention; and

FIGURE 2 is an enlarged view partly in elevation and partly in section of the unit shown in FIGURE 1.

Referring to FIGURE 1, there is shown an air conditioning unit 10 having a casing 12. The casing 12 together with partition 12' forms two compartments 18, 19. Compartment 18 contains two oppositely disposed inlets 24, 26; one inlet, preferably, communicates with a room to be conditioned while the other inlet, preferably, communicates with the exterior of the building 28 in which the unit is placed.

A fan driven by a motor (not shown) is placed in compartment 18 and serves to induce air through inlets 24, 26. If desired, a filter 14 may be placed in compartment 18.

Compartment 19 includes an outlet 20 and a heat exchanger 17 through which a medium is passed in heat exchange relation with air flowing over the heat exchanger. Fan 16, as stated above, induces air through inlets 24, 26, directs the air through an opening 9 into compartment 19, through heat exchanger 17, and discharges the treated air through outlet 20 into the room or other area being conditioned. As shown in FIGURE 1, both

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room air and fresh air may be induced into casing 12 by fan 16.

A damper arrangement 29 is provided for regulating the quantity of air induced through inlets 24, 26. The arrangement 29 includes dampers 30, 32, pivotally mounted in the casing adjacent their lower edges to permit the dampers to swing inwardly. Each damper 30, 32, includes a bracket 34 extending as shown at 24', 26' toward the center of the casing at an angle from the damper. If desired, brackets 34 are placed adjacent opposite ends of each damper. Each bracket 34 includes slot 36 and a locking offset 38. Slot 36 is longitudinal of the bracket with locking offset 38 formed at the inward edge of slot 36.

A control rod 40 extends longitudinally of casing 12, rod 40, preferably, being pivotally mounted on the ends of the casing. A control arm 42 is mounted on rod 40 by set screw 41; arm 42 interconnects dampers 30, 32. Control arm 42 carries projections or pins 45, 46 which are adapted to be slidably received in the slots 36 in brackets 34 of dampers 30, 32. A lever 44 is connected to at least one arm 42 by a wire 43 to effect rotation of control rod 40.

Upon rotation of rod 40 in a clockwise direction from the position shown in FIGURE 1, damper 32 is moved toward an open position while damper 30 is moved toward a closed position.

When damper 30 reaches closed position, as shown in FIGURE 2, pin 45 reaches a point of interference before it will slide into locking offset 38.

At this point of interference, further rotation of control arm 42 deflects the control rod 40, permitting pin 45 to move into locking offset 38, as shown by the dotted line in FIGURE 2. When pin 45 moves into locking offset 38, it moves to a point just over the horizontal center line of control rod 40 providing an over-center lock; with pin 45 in offset 38, fresh air damper 30 is held closed by the tendency of control rod 40 to return to its normal position. In this position, 100% room air is induced through room air inlet 26. Fresh air damper 30 cannot rattle or be opened by wind pressure.

Upon counterclockwise rotation of control arm 42 from the position shown by a dotted line in FIGURE 2, pin 45 moves out of offset 38 unlocking damper 30 and allowing control rod to return to its normal position. Upon further rotation of control arm 42, damper 32 is moved to close inlet 26 while damper 30 moves to open inlet 24. While both inlets 24, 26 are open, movement of dampers 30, 32 inversely, regulate the air quantities admitted respectively through the inlets. Damper 32 closes on further counterclockwise rotation of arm 42. Pin 46, at a point of interference with slot 36, deflects control rod 40, allowing pin 46 to engage the now over center offset 38 securing damper 32 in closed position. Fan 16 induces 100% fresh air into the casing when damper 32 is in closed position.

In a unit employing the present invention two dampers may be regulated for varying the respective quantities of room air and fresh air drawn into the unit while providing means for positively locking either damper in its closed position.

While we have described a preferred embodiment of our invention, it will be understood that the invention is not limited thereto but may be otherwise embodied within the scope of the following claims.

We claim:

1. In a room air conditioner, the combination of a casing having a first inlet, a second inlet and an outlet, a fan in said casing, conditioning means in said casing for air passing through the casing, said fan-inducing air into the casing through said inlets and directing at least a portion of the induced air through the conditioning means

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for discharge through the outlet, a first damper pivotally mounted adjacent its lower edge placed adjacent the first inlet, a second damper pivotally mounted adjacent its lower edge placed adjacent the second inlet, each damper having a bracket containing a slot therein, the slot including an offset portion, a rotatable control arm pivotally mounted in said casing, pins carried on said control arm adjacent its opposite ends, the pins being slidably received in the bracket slots, and means for rotating said control arm to slide pins in said slots in opposite directions thereby moving said dampers inversely, movement of one pin to a position engaging the offset portion of its co-operating slot locking the corresponding damper in fully closed position while movement of a second pin in the opposite direction in the co-operating slot of the corresponding damper moving the corresponding damper to a fully open position.

2. An air conditioning unit according to claim 1 in which said control arm is mounted on a resilient rod, said rod deflecting to hold said first or second damper closed when said pins engage the corresponding locking offset.

3. An air conditioning unit according to claim 1 in which said pins move to over center positions when engaging said locking offsets.

4. In a room air conditioner, the combination of a casing having a first inlet, a second inlet and an outlet, a fan in said casing, conditioning means in said casing for air passing through the casing, said fan inducing air into

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the casing through said inlets and directing at least a portion of the induced air through the conditioning means for discharge through the outlet, a first damper pivotally mounted adjacent its lower edge placed adjacent a first inlet, a second damper pivotally mounted adjacent its lower edge placed adjacent the second inlet, each damper having a bracket containing a slot therein, a rotatable control arm pivotally mounted in said casing, pins carried on said control arm adjacent its opposite ends, the pins being slidably received in the bracket slots, and means for rotating said control arm to slide pins in said slots in opposite directions thereby moving said damper inversely, movement of one pin to a position over center of the control arm, locking the corresponding damper in fully closed position, movement of a second pin in the opposite direction in the co-operating slot of the corresponding damper moving the corresponding damper to a fully open position.

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ROBERT A. O'LEARY, *Primary Examiner*.

W. E. WAYNER, *Assistant Examiner*.