Dec. 19, 1944. E. O. YOUNG 2,365,319

DAMPER CONTROL MEANS

Filed April 30, 1943 2 Sheets-Sheet 1

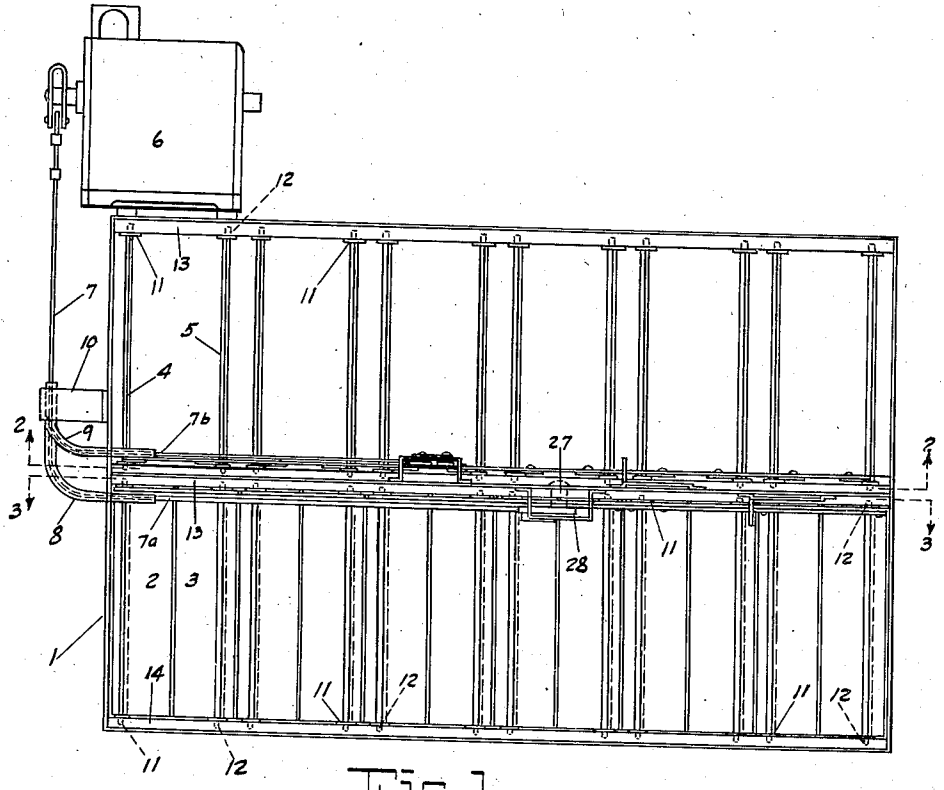


Fig. 1.

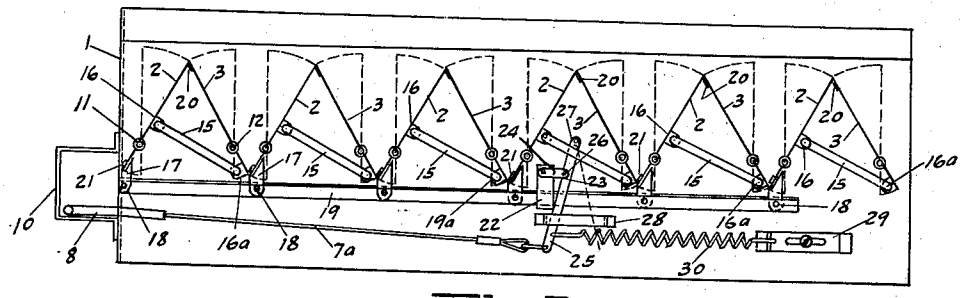


Fig. 3.

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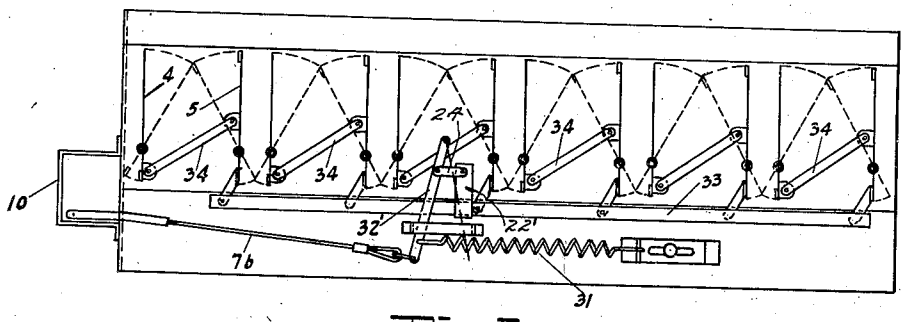


Fig. 2.

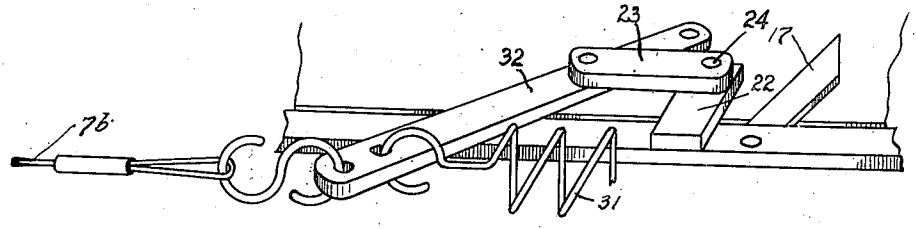


Fig. 4.

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DAMPER CONTROL MEANS

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Application April 30, 1943, Serial No. 485,245

1 Claim. (Cl. 98—110)

This invention relates to damper control means, particularly means that are used in air conditioning dampers for controlling the movement of the various blade members comprising the dampers.

It is the purpose of this invention to provide novel and sensitive control means for dampers, which are used in combination, so as to cause the movement of the blade members of one damper to open while the blade members of an associated damper member close. With the particular kind of damper used in air conditioning where a supply of conditioned air and fresh air is desired to be mixed, or otherwise controlled so as to regulate the flow of one or the other of the fresh air or conditioned air supply sources, there is generally provided a plurality of blade members adapted to operate in unison so as to accurately increase or decrease the volume of air flowing through the damper unit as a whole.

Therefore, a pair of dampers is contemplated, the blade members of one set being under the control of an actuating means, and the blade members of another set being under the control of the same actuating means, so as to cause the opposite movement of the respective blade members, as desired, and with an independence of movement for the purposes of air conditioning practise.

This invention, therefore, broadly contemplates the use of a pair of damper units in which the blade members operate in the manner hereinabove set forth. However, the manner of controlling the blade members is important, and is particularly regulated in this invention by means of spring tension members, which are so mounted in conjunction with the respective blade members of the damper units as to cause the movement of the set of blades used with the fresh air damper to open position by means of a spring, and to oppositely bias the damper members or blades of the other of the damper members to closed position at the same time, under the control of the spring means.

Other and more particular objects of the invention will be apparent upon consideration of the accompanying specification and illustrated in the accompanying drawings, wherein a typical damper unit comprising the separate damper members is shown.

In the drawings—

Figure 1 is a side elevation of the damper unuit including upper and lower damper members with the blades of the upper member in open position and those of the lower member in closed position.

Figure 2 is a sectional view taken about on the line 2—2 of Figure 1, looking in the direction of the arrows, illustrating the means for controlling the operation of the blade members.

Figure 3 is a sectional view taken about on the line 3—3 of Figure 1, looking in the direction of the arrows, illustrating the control means for the lower set of blade or vane members.

Figure 4 is a fragmentary perspective view of Figure 1, illustrating the actuating bar, lever and link parts of Figure 2 primarily, for controlling the movement of the blade members.

Referring particularly to Figure 1, it will be noted that the damper unit, of this invention, is comprised of what may be termed an outer shell 1 of substantially rectangular formation, having mounted therein fresh air blade or vane members 2 and 3, the same being duplicated throughout the length of the damper member, and conditioned air blade, or vane members 4 and 5 likewise being duplicated throughout the length of the conditioned air damper member.

Suitable motor control means 6 are shown as being mounted adjacent the upper portion of the damper unit, although since cable means 7 are availed of, this motor unit 6 may be mounted at some other location for suitably controlling the movement to be hereinafter described.

Adjacent one end of the shell 1, suitable tubing members 8 and 9, through which the cables 7 pass, are supported on a bracket 10, the purpose of these tubing members 8 and 9 being set forth in relation to Figures 2 and 3, now to be described.

The blade members 2 and 3, referring now to Figure 2 particularly, are shown as being pivotally mounted on hinge pins 11 and 12, respectively, the same being engaged in suitable openings in upper and lower supporting members 13 and 14 respectively.

The blades 2 and 3 are in the form of sheet metal members, and are controlled by means of link members 15, pivotally engaged at 16 and 16a, above and below the pivotal points 11 and 12, looking at Figure 2, and in turn, the blade member 2 is engaged by means of an extension member 17 at a pivotal point 18, upon a longitudinal bar 19. It should be understood that the blades or vanes 2 throughout the length of the air supply damper member now being described, will be similarly engaged with the bar 19.

Adjacent the upper edge of the blade 3, a suitable felt strip 20 is provided adapted to seal the damper member when the vanes 2 and 3 are

brought into closed position shown in full lines in this figure.

Adjacent the lower edge of the blade 2, an additional felt strip 21 is provided to likewise form a seal for the member as a whole. These felt strips are, likewise, duplicated in all cases on their respective vane members in the damper as a whole.

In order to cause the movement of the vane or blade members 2 and 3 to the closed position shown in full lines in Figure 3, and to the open position shown in dotted lines in that figure, suitable linkage may be provided such as is illustrated, and which comprises a projection 22, suitably rigidly engaged with the bar 19, and a short link 24 pivotally connected with the member 22, and a main lever 25 pivotally engaged with the link 24 at 26, the main lever 25 being in turn pivotally engaged at 27 to a portion of the shell 1 in which the vanes or blades 2 and 3 are pivotally mounted.

A suitable guide 28 is provided on the member 14 for limiting the pivotal movement of the main lever 25. Likewise, engaged with the part 14 is tension adjustment means generally denoted 29, and fastened at one end to the tension adjustment means 29 is a spring 30, the other end of the said spring being engaged with the main lever 25. The main lever 25 is likewise engaged with the cable 7a which is a part of the cable 7, previously referred to.

From the foregoing, it will be observed that since the pivot 27 is a fixed pivot, movement of the lever 25 into the dotted line position shown in Figure 3, will, under contracting movement of the spring 30, cause the bar 19 to move toward the right. This, in turn, will move the blade or vane member 2 in a counter-clockwise direction toward the dotted line position shown in this figure, and by reason of the link 15, connection of the blade or vane 2, with the vane 3, will cause the said vane 3 to move clockwise toward the dotted line position. There is, therefore, effected an opposite movement of the said blade or vane members 2 and 3, as respects their rotative movement simultaneously. The movement of the blade or vane members toward and from the limit of their positions, as illustrated in full and dotted lines, will, therefore, control the flow of air in the direction of the arrow so as to increase or decrease the flow in accordance with the requirements of the eventual place of use of the air. It will be noted that the spring 30 causes the movement of the blade or vane members 2 and 3, out of the closed position shown in Figure 3, upon relieving the tension upon the cable part 7a. This, of course, is regulated by the movement of the motor unit 6 mounted on the damper unit.

Referring now to Figure 2, it will be observed that the vane and linkage connections are the same as those illustrated in Figure 3, with the notable exception that the connection of the spring 31 with the main lever 32 of this damper member will cause the movement of the bar 33 toward the right, but since the vane or blade members 4 and 5 are interconnected by means of the links 34, rightward movement of the bar 33 will cause the said blade or vane members 4 and 5 to move toward a closed position illustrated in the dotted lines in this figure. The lever 32 is connected with projection 22' by link 24'. This movement is similarly under the control of a spring, namely, 31, but as contrasted with the spring 30, the contracting movement of the spring 31, will cause the vane or blade members 4 and 5 to move toward a closed position, upon relieving of the tension in the cable part 7b. Since the cable parts 7b and 7a are positioned to form the cable 7, and the tension is released in both of these cable parts, at the same time, it will be seen that the springs 30 and 31, cause simultaneous but opposite movement of the respective blade members controlled thereby. This is a novel feature of the invention, and provides adequate and sensitive control for the various blade or vane members without the necessity of a rigid connection to the operating motor 6.

It should be noted that these damper members, as illustrated in Figures 2 and 3, are in reality exactly similar members, but by reason of their association in the damper unit as a whole, are caused to operate in opposite directions.

This relationship is further pointed out by noting that the damper member of Figure 3 is merely transposed in Figure 2, so as to cause the Figure 2 member to be that of the opposite hand. This is a novel means of availing of the peculiar linkage structure used, and permitting the same to be controlled by the springs 30 and 31, so as to move oppositely upon relieving of the tension in the cable parts 7a and 7b.

It will be understood that the tube members 8 and 9 are primarily guide means for the cable parts 7a and 7b, to permit the mounting of the control motor 6 above the damper unit, and as before pointed out, it will be apparent that additional tubing members such as the members 8 and 9 may be availed of, if the motor 6 is mounted at some other location.

Of course, it will be apparent that by causing a tensioning of the cables 7a and 7b, the expanding movement of the springs 30 and 31, controlled respectively by the cable parts, will cause the blades of their respective damper members to move toward closed and open positions respectively.

The cable 7 is bifurcated from just above the tube members 8 and 9 to provide the cable parts 7a and 7b.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

In a damper unit, a casing comprising two compartments in superposed relation with a space therebetween, a damper member in each compartment including a plurality of blades, arranged in connected pairs and pivoted to the opposite upper and lower sides of each compartment, the axes of the blades of one damper being alined with those of the other, like means in said space to open and close pairs of the blades of each damper member, each said means comprising a longitudinal bar connected with the blades of each damper, a pivoted lever connected at a point between its ends with said bar and pivoted at one end to the casing, a guide part for the lever, spring means connected to and near the end of the lever opposite that pivoted to the casing and normally tending to pull the lever in one direction, cable means to pull the lever in an opposite direction, and a tension adjusting member connecting the spring means at one end of the adjacent wall of the casing, and instrumentalities external to the casing for pulling on the cable means to operate the blades of the dampers.

EMIL O. YOUNG.