Dec. 19, 1944. E. O. YOUNG 2,365,320

DAMPER LINKAGE

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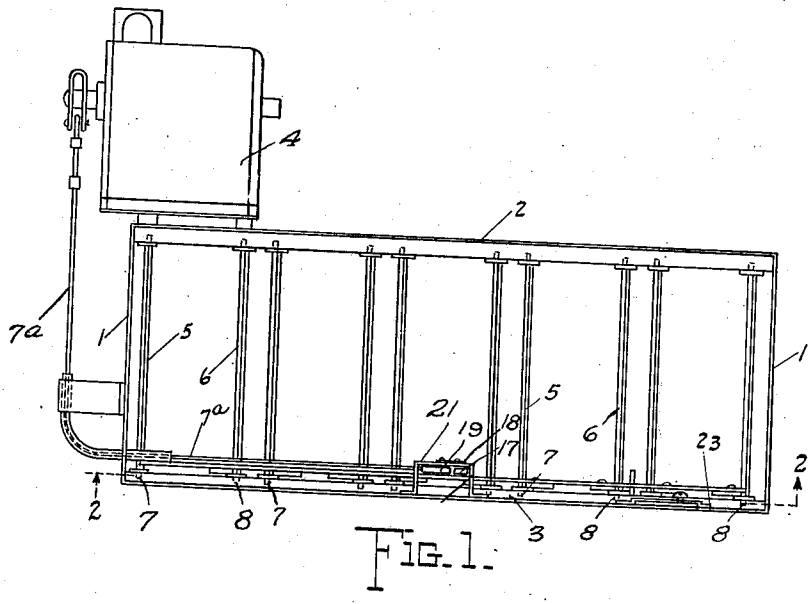


Fig. 1.

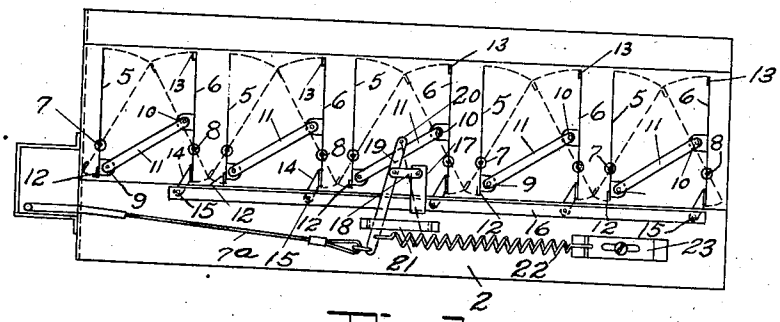


Fig. 2.

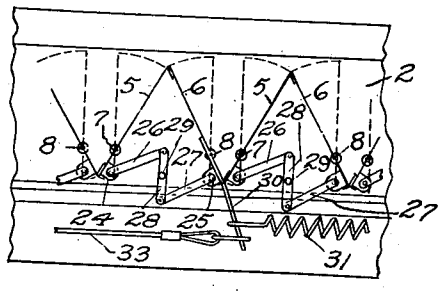


Fig. 3.

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DAMPER LINKAGE

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2 Claims. (Cl. 98—110)

This invention relates to linkage structure used in dampers, or the like, and has particular application to dampers used for air conditioning systems.

It is an object of this invention to provide a novel form of linkage and connection thereof, with the blades, comprising the damper, whereby to accurately control the movement of the blades and to cause the movement of the same into open and closed positions with a minimum amount of movement of the control instrumentalities therefor.

It is a further object of this invention to provide a novel mounting for the blades of the damper, whereby the movement of these members takes place through a very small arc.

It is a further object of this invention to provide novel connection between the various blades of the damper in combination with the mounting therefor, whereby to effect the desired minimum movement of said blades.

Further and more particular objects of the invention will be apparent upon consideration of the accompanying specification and illustrations in the drawing.

In the drawing—

Figure 1 is a side elevation of a damper including the blades thereof, and motor means for operating the same.

Figure 2 is a sectional view taken about on the line 2—2 of Figure 1, looking in the direction of the arrows, and illustrating in more particularity the linkage and mounting of the blades.

Figure 3 is a sectional view of a modified form of linkage structure.

Referring particularly to Figure 1, it will be noted that the damper is constructed so as to include a substantially rectangular shell, including the ends 1, and top and bottom members 2 and 3 respectively. Mounted adjacent the top member 2 is a suitable motor member 4 adapted to control the movement of the blades 5 and 6, by means of a cable 7a.

Passing now to Figure 2, it will be noted that the blades 5 and 6 are shown as being pivotally mounted at 7 and 8 respectively, in the top and bottom members 2 and 3. The said blades 5 and 6 comprise sheet metal members of substantially rectangular formation including pivotal members 9 and 10, the same being interconnected by means of a link 11.

The blades 5 and 6 are mounted on the pivotal points 7 and 8 in such a manner that these pivotal points are more nearly adjacent one edge of the blades for purposes that will be hereinafter set forth.

Suitable felt strips 12 and 13 are provided on the blades 5 and 6 for sealing the same in their closed position.

It should be understood that the foregoing construction of blades and links is duplicated throughout the length of the damper, and it will be noted that the blades 6 are interconnected at their lower edges looking now at Figure 2, by means of arms 14 extending downwardly from the lower edges thereof, and pivotally connected at 15 to an actuating bar 16.

Adjacent the center of the damper, the bar 16 is provided with an upstanding arm 17 rigidly connected therewith, the same being in turn connected with a link 18, and the link 18 being pivotally engaged with a large lever 19. The large lever 19 is pivotally engaged at its upper end at 20, with the lower member 3 of the damper, and its lower end is engaged with the cable 7a operated by the motor 4. A suitable guide 21 is provided at this point for the lever 19, and the said lever is connected with a spring 22 to a tension adjusting means 23 fastened to the lower member 3.

Since the lever 19 is pivotally engaged at 20 with the member 3, movement of the lever in a counterclockwise direction upon relieving the tension in the cable 7a will cause the bar 16 to move toward the right, and since the bar 16 is in turn connected with each of the blades 6 of the unit, simultaneous movement of the blades will be caused to take place toward the dotted line position of Figure 2. This simultaneous movement will likewise simultaneously cause movement of the blades 5 toward the dotted line position of this figure, by reason of the connection of the blades by means of the links 11. This obviously causes movement of the upper edges of the blades toward one another, and, of course, the movement of the bar 16 in the opposite direction will cause the movement of the upper edges of the blades 5 and 6 away from one another.

However, it is important to note that because of the position of the pivots 7 and 8, substantially adjacent the lower edges of the blades 5 and 6, the arc of movement of the upper edges of the said blades is a very small arc. This is essential for proper control of the flow of air through the damper and permits the flow to be very accurately controlled with a minimum amount of movement of the blades of the damper either toward or from the open and closed positions.

Referring now to Figure 3, wherein is disclosed a modified form of linkage, it will be noted that the blades **5** and **6** are similarly mounted on the pivots **7** and **8** respectively, and the blades include pivotal connecting members **24** and **25**, at the lower edges of the same. These pivotal members are in turn engaged with links **26** and **27** respectively, and the links in turn engage at their inner ends with an actuating lever **28**, said actuating lever being supported on a central pivot **29** supported on the bottom member of the unit.

The construction above referred to will be duplicated in respect to each pair of vanes throughout the length of the damper, and will be actuated by a main arm **30** connected to one of the blades **5** or **6**, in this instance, being connected to the blade **6** and extending downwardly therefrom.

The arm **30** will be a rigid arm of substantial length, and will be engaged at its lower end with a spring **31**, similar to the spring **22** before referred to, and, likewise, be controlled for movement by means of a cable **33**.

When the arm **30** is moved in a clockwise direction, upon tensioning the cable **33**, it will be seen that the upper edge of the blade **6** will move toward the dotted line position shown in this figure, around the pivot **8**, and because of the connection of the blade **5** therewith, by means of links **26**, **27** and **28**, the last named blade will, likewise, be moved simultaneously toward the dotted line position around the pivot **7**. In this modified form of damper, it will be noted that the opening and closing movements of the vane members are similarly controlled throughout the very small arc of movement, as was the case with reference to Figure 2, the primary difference resting in the linkage structure interconnecting the lower ends of the same. The same arc of movement, of course, is due to the location of the pivotal points **7**, and **8**, which, for the purposes of this invention, are very important, and permit the accurate regulation of the flow of air through the damper.

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

1. In a damper of the class described, a pair of swingable blade members, a pivotal mounting for said blade members spaced a substantial distance from the center thereof, a single link pivotally connecting said blade members, the point of pivotal connection of one end of the link with one blade member being at one side of the axis of pivotal support thereof, and the point of pivotal connection of the other end of the link with the other blade member being at the opposite side of the axis of pivotal support of the other blade member, an arm connected to one of said blade members, and an actuating bar for said arm.

2. In a damper of the class described, a plurality of pairs of blades, a housing surrounding said blades, said blades being pivotally supported in said housing at points spaced a substantial distance from the centers of the blades, a single link connecting each pair of blades attached to one blade at one side of its pivotal axis and to the other blade at the opposite side of its pivotal axis, an actuating bar connected with one of the blades for each pair, and a lever connected with said bar for causing simultaneous movements of the pairs of blades toward and from closed position.

EMIL O. YOUNG.