

Jan. 9, 1940.

C. S. WHEELER

2,186,353

ADJUSTABLE DAMPER

Filed June 27, 1938

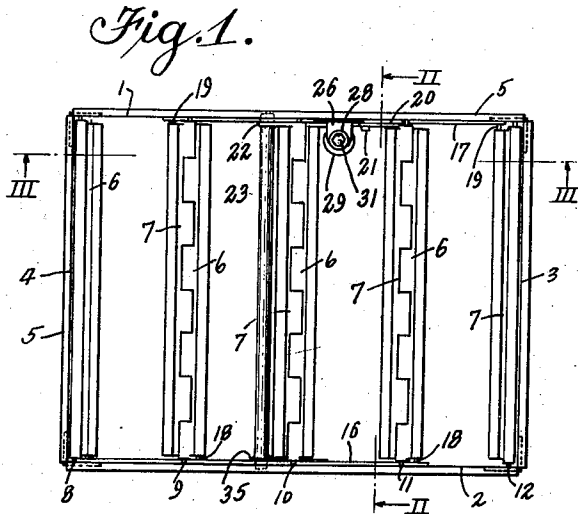
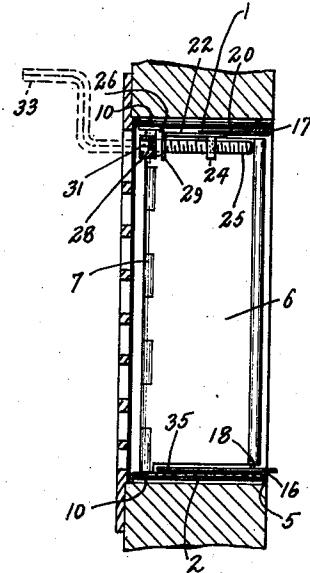
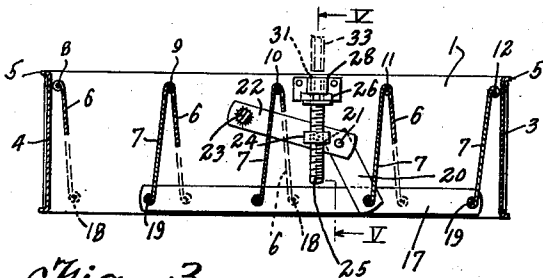


Fig. 2.

Fig. 3.

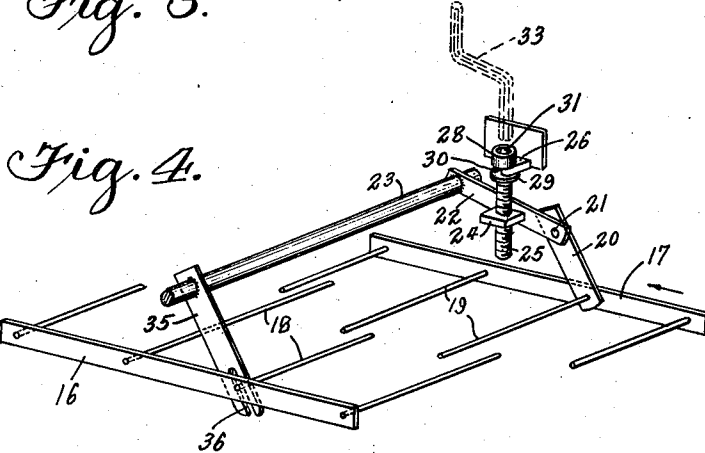


Fig. 4.

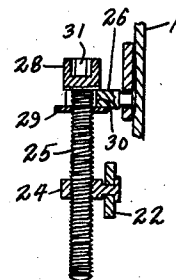


Fig. 5.

Inventor

Charles S. Wheeler

By *Lyon & Lyon*

Attorneys

UNITED STATES PATENT OFFICE

2,186,353

ADJUSTABLE DAMPER

Charles S. Wheeler, Los Angeles, Calif., assignor to Controlair Manufacturing Co., a partnership firm composed of Charles S. Wheeler, an individual, and H. S. McClelland, Inc., a corporation of California

Application June 27, 1938, Serial No. 216,061

3 Claims. (Cl. 98—110)

This invention relates to damper structures of the general type employed in air registers of air conditioning systems, and the like, and has, as a broad object, to provide a simple, reliable and inexpensive mechanism for adjusting the vanes of a damper to vary the flow of air therethrough and for holding the vanes in adjusted position.

The manner in which this object is attained, together with minor objects and features of the invention, will now be disclosed by describing in detail, with reference to the drawing, a specific embodiment of the invention.

In the drawing:

Fig. 1 is a front elevational view of a damper in accordance with the invention shown in substantially open position;

Fig. 2 is a vertical section taken through the damper, approximately in the plane II—II of Fig. 1, and showing the damper installed in an air passage in a wall behind an ornamental grill;

Fig. 3 is a view taken in the horizontal plane III—III of Fig. 1, looking upwardly at the adjusting mechanism which is positioned below the top wall of the damper frame;

Fig. 4 is a skeleton perspective view of the adjusting mechanism only, detached from the frame and the damper vanes; and

Fig. 5 is a detail vertical sectional view taken approximately on the line V—V of Fig. 3.

Referring, first, to Figs. 1 and 2, the damper construction therein depicted comprises a rectangular frame consisting of a top plate 1, a bottom plate 2 and side plates 3 and 4, all of which are secured together at the corners to form a relatively rigid framework. The front and rear edges may be bent outwardly at right angles to define reinforcing flanges 5 which also function to fit against the walls of the passage in which the damper is mounted and maintain clearance between the ends of moving elements projecting through the upper and lower walls 1 and 2 with respect to the upper and lower walls of the passage in which the damper is mounted, all as shown in Fig. 2.

The particular damper shown has mounted between the upper and lower frame plates 1 and 2 eight vanes divided into two sets, those in one set being identified by the reference numeral 6 and those in the other group by the reference numeral 7. Each of these vanes is supported for swinging movement about its front edge as an axis. To this end a plurality of vertical rods 8, 9, 10, 11 and 12 are extended between and anchored at their upper and lower ends to the upper and lower frame plates 1 and 2, res-

spectively. The edge vanes 6 and 7 are pivotally secured to the end rods 8 and 12, respectively, by folding the ends of the vanes about the rods. The remaining vanes are each provided with spaced leaves at their front edge, which are folded around the rods 9, 10 and 11, the leaves on each two adjacent vanes 6 and 7 being folded about the associated rod 9, 10 or 11 in staggered relation in piano hinge fashion, as shown clearly in Fig. 1. When the vanes are in open position, they extend substantially parallel to the side frame members 3 and 4, the vane 6 associated with the rod 8 lying flat against the member 4; the vane member 7 associated with rod 12 lying flat against the wall member 3; and the remaining vanes 6 and 7 associated with each of the rods 9, 10 and 11 lying flat against each other. To close the damper all of the vanes 6 are rotated in counter-clockwise direction and all of the vanes 7 are rotated in clockwise direction (the direction of rotation being taken with reference to Fig. 3), until the rear free edges of each of the vanes 6 abut against the free edge of one of the vanes 7.

All of the vanes 6 are connected for movement in unison by a bar 16 lying against the upper surface of the lower frame member 2 and all of the vanes 7 are interconnected for movement in unison by a bar 17 lying against the under surface of the top frame plate 1. Thus the rear edge of each vane 6 is rolled around and thereby secured to a rod 18, the lower ends of all of which rods extend slightly below the lower edges of the vanes and project into apertures provided therefor in the bar 16. Similarly, the rear edges of all of the vanes 7 are rolled about and engage rods 19, the upper ends of which project beyond the upper edges of the vanes 7 and into apertures provided therefor in the bar 17. These bars 16 and 17 are adapted to be moved simultaneously in opposite directions by a mechanism next to be described.

With reference, first, to the bar 17, a link 20, positioned immediately below the top frame plate 1, is provided at one end with an aperture which receives the rod 19 attached to that vane 7 which is associated with the hinge rod 11. The other end of link 20 is pivotally connected, as by a rivet 21, to the outer end of an arm 22 also positioned immediately below the top frame plate 1, which arm is anchored to a shaft 23 for rotation therewith, the shaft 23 extending through and being pivotally supported at its upper and lower ends by the upper and lower frame plates 1 and 2, respectively. The arm 22 is

has pivotally secured thereto a nut 24 (Figs. 4 and 5), which nut is in threaded engagement with a screw 25 rotatably supported at its forward end by a bracket 26 which is pivotally secured to the upper frame plate 1. The screw 25 has a head 28 on its forward end which restrains the screw against rearward motion with respect to the bracket 26 and a washer 29 is pressed on the screw immediately back of the bracket 26 to prevent forward movement of the screw. The screw 25 passes through an aperture 30 in the bracket 26 which aperture is substantially larger than the screw so that the screw fits loosely therein. The screw head 28 is provided with a hexagonal socket recess 31 for the reception of a wrench 33 (Fig. 4).

By turning the screw 25 the nut 24 is caused to move back and forth along the screw to swing the arm 22 through an arc. This movement is transmitted through link 20 and the rod 19, which it engages and thence to the bar 17 causing simultaneous motion of all of the vanes 7 toward open or closed position, depending upon the direction of rotation of the screw 25.

The movement of arm 22, by the screw and nut as described, also rotates the shaft 23 to which arm 22 is affixed and the movement of this shaft is utilized to simultaneously shift the bar 16 which controls the vanes 6. Thus there is secured to the shaft 23 near its lower end just above the lower frame plate 2 an arm 35, the outer end of which is provided with a longitudinal slot 36 which engages the rod 18 connected to that vane 6 which is hinged on the rod 19. Therefore swinging movement of the arm 35 is transmitted to the bar 16 to simultaneously swing the rear edges of all of the vanes 6. It will be observed from an inspection of Fig. 3 that the shaft 23 is positioned relatively close to the rod 19 which constitutes the axis of swinging movement of the rod 18 which the slotted arm 35 engages. The slot 36 permits of the sliding movement necessary between the arm 35 and the rod 18 with which it connects by virtue of the spacing between the rod 19 and the shaft 23.

The lengths of link 20, arm 22 and arm 35, and their relative positions, are such that any swinging movement of arm 22 produces equal swinging movement of both the bar 16 and the bar 17 but in opposite directions, thereby simultaneously moving all of the vanes either toward open or closed position, depending upon the direction of rotation of the screw 25.

Thus referring to Fig. 4, turning the screw 25 in counter-clockwise direction moves the nut 24 downwardly, swinging the arms 22 and 35 in clockwise direction. The movement of arm 35 swings the bar 16 and the rods 18 toward the left, thereby moving the vanes 6 toward open position. On the other hand the clockwise motion of the arm 22 tends to straighten the toggle link, consisting of arm 22 and link 20 taken together, thereby swinging the bar 17 and the rod 19 toward the right, which moves the vanes 7 toward open position. Reverse motion of the screw 25 moves bar 16 to the right and bar 17 to the left, thereby moving the vanes 6 and 7 toward closed position.

By virtue of the low pitch of the threads on screw 25 and nut 24, the drive is irreversible so that when the vanes are adjusted to a desired position and the key or wrench 33 removed, it is impossible for the vanes to become displaced from the position into which they have been set.

For the purpose of explaining the invention, a particular embodiment thereof has been described in detail, but it is to be understood that departures can be made from the specific construction shown without departing from the invention, which is to be limited only to the extent set forth in the appended claims.

I claim:

1. A device of the type described, comprising a pair of spaced apart frame members, a first vane positioned between said frame members and supported for swinging movement about an axis extending between said frame members, a second vane mounted for swinging movement between said frame members about an axis parallel to the axis of said first vane, a shaft extending between said frame members and rotatably supported thereby, a pair of arms secured to said shaft for rotation thereby, one arm being positioned adjacent one of said frame members and the other arm being positioned adjacent the other frame member, means connecting one of said arms to one of said vanes for rotation of that vane about its axis in response to rotation of said shaft, means connecting the other arm to the other vane for rotation of the said other vane by the shaft simultaneously with but in a direction opposite to the direction of rotation of said one vane, and means for rotating said shaft.

2. A device of the type described, comprising a pair of spaced apart frame members, a first vane positioned between said frame members and supported for swinging movement about an axis extending between said frame members, a second vane positioned between said frame members and supported for swinging movement about a second axis parallel to said first mentioned axis, a shaft extending between said frame members and rotatably supported thereby, a pair of arms secured to said shaft for rotation thereby, link means connecting one of said arms to one of said vanes for rotation of that vane about its axis in a direction opposite to said shaft in response to rotation of said shaft, means slidably connecting said other arm to a point on said other vane spaced from the axis thereof, whereby rotation of said shaft rotates said other vane about its axis in the same direction as the shaft, and means for rotating said shaft and holding it in any position to which it is rotated.

3. A device as described in claim 1, including a plurality of vanes additional to said first and second vanes with means interconnecting a portion of said additional vanes to said first vane for movement in unison therewith in one direction, and means connecting the remainder of said additional vanes to said second vane for simultaneous movement with said second vane in the opposite direction.

CHARLES S. WHEELER.