

Feb. 12, 1957

W. C. DE ROO

2,780,983

VOLUME CONTROL FOR REGISTERS

Filed May 12, 1954

2 Sheets-Sheet 1

FIG. 1

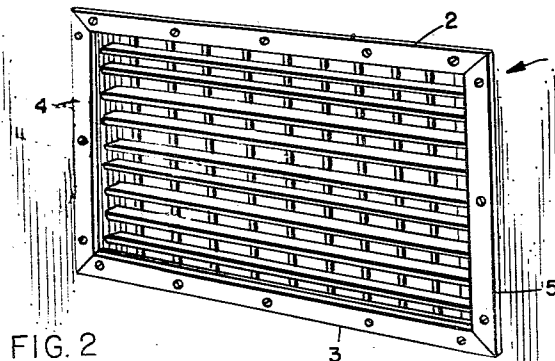


FIG. 2

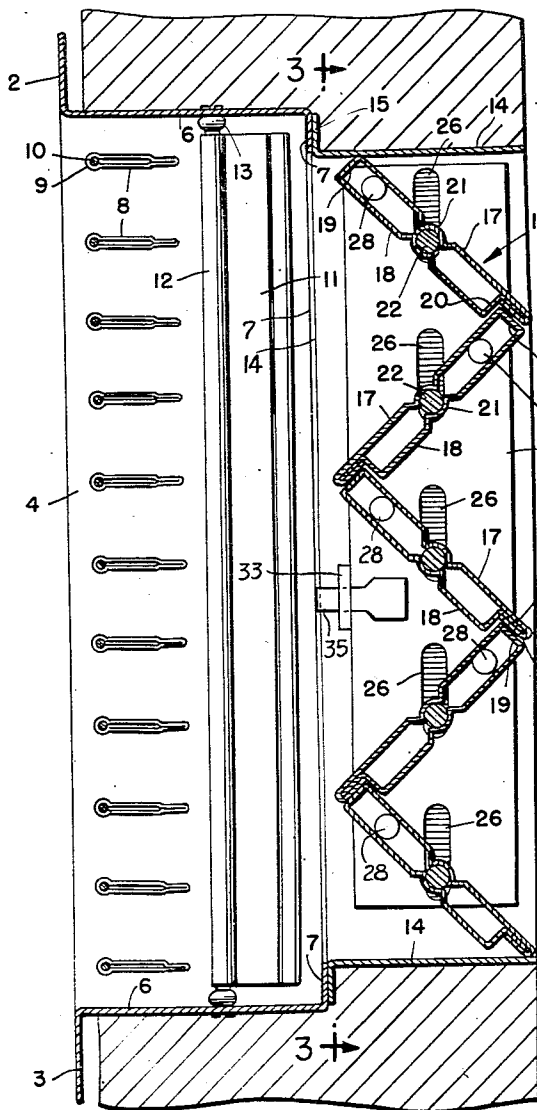


FIG. 4

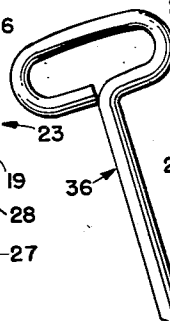
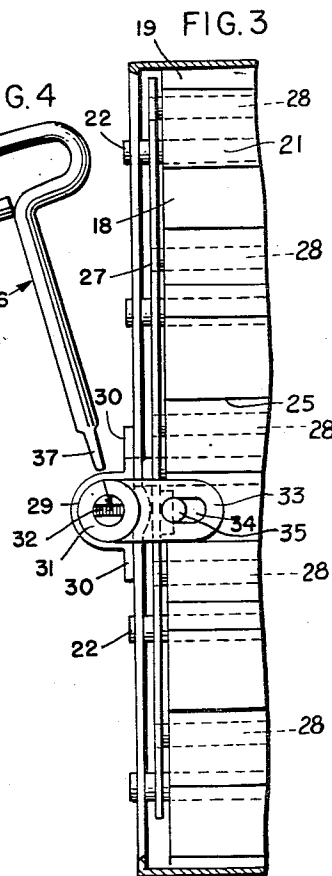


FIG. 3



INVENTOR:
WILLIAM C. DEROO
BY

Marshall, Johnston, Cook & Root.
ATT'YS

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W. C. DE ROO

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FIG. 5

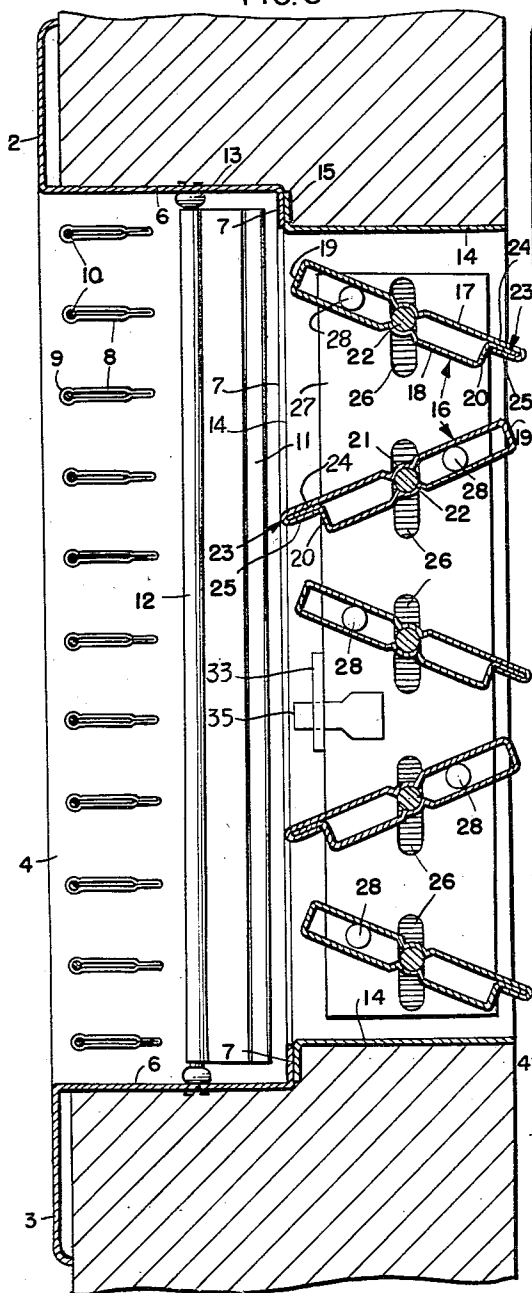
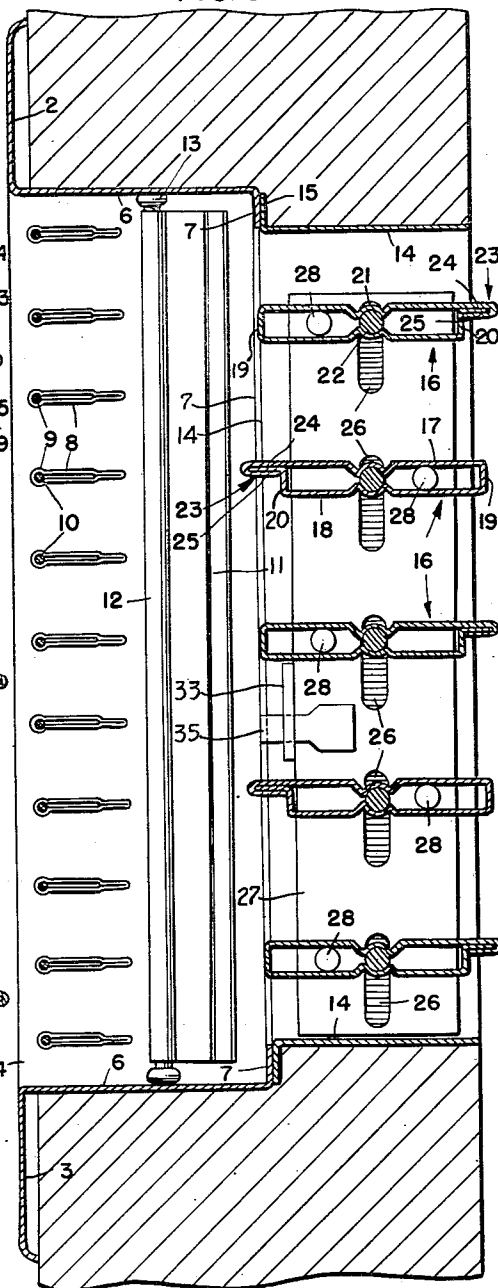


FIG. 6



INVENTOR:

WILLIAM C. DEROO

BY

Marshall Johnston, Cook & Root.
ATT'YS

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VOLUME CONTROL FOR REGISTERS

William C. De Roo, Holland, Mich., assignor to Hart & Cooley Manufacturing Co., Holland, Mich., a corporation of Delaware

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9 Claims. (Cl. 98—110)

This invention relates in general to a volume control device for registers, grilles, and the like, and is particularly directed to a novel form of volume control embodying the opposed blade feature wherein adjacent damper blades are caused to rotate in opposite directions between open and closed positions.

Opposed blade types of volume control have been used heretofore but the present invention embodies a construction where the blade is very light in weight and yet rigid and therefore can be operated with very little effort.

The volume control embodying the present invention may be utilized in combination with various types of registers and grilles having directional vanes formed as a part thereof. Some registers such as the type illustrated herein utilize a front set of directional vanes and a rear set of directional vanes disposed transversely of the front set and a volume control device disposed rearwardly of both sets of vanes. In some instances the front set of vanes is positioned vertically and the rear set horizontally and in other instances the front set is vertical and the rear set horizontal. Also, in many instances the rear set of vanes may be omitted whereupon only one set may be utilized for varying the direction of the air, the volume of which is controlled by the damper assembly positioned rearwardly thereof. The volume control device of the present invention is adapted to be utilized with any register or grille regardless of the directional vane assembly as above mentioned.

A principal object of the invention is to provide a volume control device for registers and the like wherein the blades thereof have a minimum rotational movement between completely open and completely closed positions.

Another object of the invention is to provide a volume control for registers of the opposed blade type which is very light in weight and yet rigid and which embodies a novel construction of blade permitting the use of operating mechanism requiring minimum movement for shifting the blades from closed to open positions.

A further object of the invention is to provide a volume control for registers wherein each blade is hollow thereby resulting in a lightweight and yet rigid construction and which enables the use of a novel form of blade shifting mechanism heretofore impossible with the customary solid type of blade.

Still another object of the invention is to provide an opposed blade type of volume control device wherein each blade is hollow throughout its length and is pivoted for rotation about a longitudinal axis substantially midway between the edges thereof and wherein a shifter bar has pins thereon extending into the hollow blades whereby a cam action occurs to rotate the blades when the bar is shifted.

Still another object of the invention is to provide a novel form of blade for an opposed blade type of volume control wherein the blade is hollow and wherein one edge thereof is relatively wide and flat and the opposite

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edge has a relatively thin lip thereon adapted to engage the flat edge of an adjacent blade when the blades are closed.

Other objects and advantages of the invention will become apparent upon reading the following description taken in conjunction with the accompanying drawings, in which:

Fig. 1 is a perspective view of a register which may have the volume control of the present invention applied thereto;

Fig. 2 is an enlarged vertical sectional view through the device of Fig. 1 illustrating the volume control device of the present invention as it appears in closed position;

Fig. 3 is a fragmentary sectional view through the register taken along the plane of line 3—3 of Fig. 2 showing the volume control damper blades in elevation;

Fig. 4 is an elevational view of a key adapted to be used for moving the shifter bar and opening or closing the blades;

Fig. 5 is a view similar to Fig. 2 showing the volume control blades in a partially open position, and

Fig. 6 is a view similar to Fig. 5 showing the volume control blades in completely open position.

Referring now more particularly to the drawings, a register to which the present invention may be applied is generally indicated by the numeral 1 and may have upper and lower frame members 2 and 3 and end frame members 4 and 5. These frame members are preferably formed in a substantially Z shape having an intermediate rearwardly extending web 6 and an inner or rear inwardly extending flange 7.

For purposes of illustration only the register is shown as having a plurality of outer or front directional vanes 8 horizontally positioned for rotative movement. Each vane 8 at its forward edge is enlarged as at 9 to receive the horizontally positioned pivot pin 10. These blades may be manually moved individually to direct the air emerging from the register either upwardly, downwardly or straight outwardly.

If desired, there may be a plurality of vertically positioned directional vanes 11 disposed rearward of the front vanes 8 each of which has an enlarged portion 12 at its forward edge to receive the pivot pins 13. These vanes 11 may be manually rotated to adjust the direction of the emerging air to either side or straight outwardly between the front vanes 8.

A rear frame member consisting of side and end plates 14 and outwardly extending flanges 15 is secured such as by welding or other suitable means to the flange 7 of the front frame member and is adapted to receive and rotatably mount the volume control blades embodying the present invention. Each blade is indicated generally by the numeral 16 and since all of the blades are identical, a description of one will suffice for all. Each blade 16 is formed so as to provide spaced sides 17 and 18 with a connecting portion 19 along one longitudinal edge thereof. These relatively broad and flat edge portions 19 are disposed in opposite directions on adjacent blades. For example, as may be seen in Fig. 2, the uppermost blade has its wide edge 19 disposed forwardly, whereas the next lower blade has its comparable flat edge disposed rearwardly.

The opposite longitudinal edge of each blade 16 is also relatively wide and consists of an edge portion 20 extending from the side 18 toward and in abutting relation with the opposed side 17.

Intermediate the longitudinal edges 19 and 20, each side 17 and 18 is formed to provide an arc of a circle as shown at 21 so that it may receive a pivot pin 22. Each blade is mounted for rotation about its associated pivot pin 22.

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The opposed edge 20 of each blade is formed into a lip 23 extending lengthwise thereof. In the present instance the lip is formed by an outwardly extending flange 24 formed by bending the edge 20 outwardly and this flange is surrounded by a return-bent portion 25 at the edge of the side 17.

As may be noted from Fig. 2, when the blades are in closed position the lip 23 on one blade will overlie the relatively wide flat edge 19 of an adjacent blade. Thus, the wide edge 19 of one blade will be moved into substantially abutting relation with the lip 23 and edge 20 of an adjacent blade, thereby effectively to stop the flow of air between the blades.

A plurality of elongated slots 26 is provided in a shifter bar 27, one slot for each blade. The shifter bar 27 is positioned vertically within the frame 14 so that each slot 26 therein will receive a pivot pin 22. The shifter bar 27 also has a plurality of operating pins 28 extending inwardly therefrom, each pin 28 extending into an associated blade between the sides 17 and 18 thereof.

It will be noted that the operating pins 28 are disposed in staggered relationship on opposite sides of the center line of the shifter bar so that when the bar is shifted vertically alternate operating pins will rotate alternate blades in the same direction and the remaining pins will rotate the remaining blades in the opposite direction.

Thus, from viewing Fig. 2 it will be evident that the shifter bar 27 will have to be moved downwardly to open the blades. When this occurs, the uppermost operating pin 28 will act as a cam to rotate the uppermost blade in a counter-clockwise direction. Since the next lower pin 28 is at the opposite side of the shifter bar it will act to move the next lower blade in a clockwise direction. This sequence follows alternately throughout the remainder of the blades. Since the pivot pins 22 do not move, the slots 26 will permit the bar 27 to be shifted so that the pivot pins 22 will traverse those slots.

Any suitable means may be provided for manually shifting the bar 27 and in the embodiment shown there is provided a strap 29 at one end of the frame having flanges 30 thereon so that it may be secured to the frame. A rotatable member 31 is held in place by the strap 29 and has a recess therein, a part of which is formed with parallel sides as shown in Fig. 3. An arm 33 extends inwardly from the member 31 and is adapted to be rotated therewith either upwardly or downwardly. An elongated slot 34 in the arm 33 receives a pin 35 fixed to the shifter bar 27 so that from the position shown in Fig. 3 a downward movement of arm 33 will cause bar 27 also to move downwardly.

The friction between strap 29 and rotatable member 31, as well as between pivot pins 22 and the associated blades, is sufficient to maintain the blades in any position to which they have been adjusted and to prevent feathering thereof.

Any suitable form of operating device may be utilized for rotating the arm 33 and for purposes of illustration a typical key for this purpose is shown at 36. This key is formed with relatively narrow flat sides 37 at one end thereof to be received within the recess 32, whereupon the key may be rotated and carry with it the arm 33 for shifting the bar as above described.

Viewing Figs. 5 and 6 it will be noted that in Fig. 5 the shifter bar 27 has been moved downwardly a short distance so that the pivot pins 22 are in substantially the center of their associated slots 26. Each operating pin 28 has also been slightly shifted with respect to its associated blade so that the blades are in partially open position.

In Fig. 6 the bar 27 has been moved to its lowermost position and the pivot pins 22 are in the uppermost part of the associated slots 26.

The reverse procedure is followed in closing the blades back to their original position as shown in Fig. 2.

Numerous advantages result from the use of the volume

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control device as described above. For example, each blade may be constructed of sheet metal and formed with spaced sides and thus the manufacturing cost of providing a hollow blade is less than the cost of manufacturing solid blades. The hollow blades cooperate with the operating pins 28 so that a cam action occurs when the blades are moved to open and closed positions. The relatively thin lip on one edge of a blade will cooperate with the relatively wide edge of an adjacent blade to effectively seal off the flow of air.

While the edge 19 of each blade has been described as being substantially flat to permit the lip of an adjacent blade to move into sealing contact therewith, it will be obvious that any other shape would be equally as useful and effective provided the lip on an adjacent blade were to have a complementary formation.

Changes may be made in the form, construction and arrangement of parts from those disclosed herein without in any way departing from the spirit of the invention or sacrificing any of the attendant advantages thereof, provided, however, that such changes fall within the scope of the claims appended hereto.

The invention is hereby claimed as follows:

1. A volume control device for regulating air movement through registers and the like comprising, a frame, a plurality of damper blades hollow throughout the length thereof and extending between opposed sides of said frame in parallel and adjacent relationship, pivot means mounting each of said blades for rotation about a longitudinal axis substantially midway between the edges thereof, and operating means extending into each blade between the sides thereof for simultaneously rotating adjacent blades in opposite directions between open and closed positions.

2. A volume control device for regulating air movement through registers and the like comprising, a frame, a plurality of hollow damper blades extending between opposed sides of said frame in parallel and adjacent relationship, pivot means mounting each of said blades for rotation about a longitudinal axis substantially midway between the edges thereof, and operating means for simultaneously rotating adjacent blades in opposite directions between open and closed positions, each of said blades having an extended portion along one longitudinal edge thereof of less thickness than the thickness of the blade and adapted to abut an edge of an adjacent blade to effectively stop air flow when the blades are in closed position.

3. A volume control device for regulating air movement through registers and the like comprising, a frame, a plurality of damper blades hollow throughout the length thereof and extending between opposed sides of said frame in parallel and adjacent relationship, pivot means mounting each of said blades for rotation about a longitudinal axis substantially midway between the edges thereof, a slidably mounted operating member at one side of said frame, and cooperating means on said operating member and within each hollow blade for rotating adjacent blades simultaneously in opposite directions between open and closed positions.

4. A volume control device for regulating air movement through registers and the like comprising, a frame, a plurality of damper blades hollow throughout the length thereof and extending between opposed sides of said frame in parallel and adjacent relationship, pivot means mounting each of said blades for rotation about a longitudinal axis substantially midway between the edges thereof, a slidably mounted operating member at one side of said frame, and a plurality of pins on said operating member each extending into a hollow blade and each slidable on an interior surface of said blade relatively towards or away from the pivot means therefor upon movement of said operating member for rotating adjacent blades simultaneously in opposite directions between open and closed positions.

5. A volume control device for regulating air move-

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ment through registers and the like comprising, a frame, a plurality of damper blades hollow throughout the length thereof and extending between opposed sides of said frame in parallel and adjacent relationship, pivot means mounting each of said blades for rotation about a longitudinal axis substantially midway between the edges thereof, a slidably mounted operating member at one side of said frame, and a plurality of pins on said operating member spaced apart along the length thereof in staggered relation, each of said pins extending into a hollow blade and each slidable on an interior surface of said blade relatively towards or away from the pivot means therefor, whereby movement of said member will rotate adjacent blades simultaneously in opposite directions between open and closed positions.

6. A volume control device for regulating air movement through registers and the like comprising, a frame, a plurality of damper blades hollow throughout the length thereof and extending between opposed sides of said frame in parallel and adjacent relationship, pivot means mounting each of said blades for rotation about a longitudinal axis substantially midway between the edges thereof, an operating bar mounted at one side of said frame for longitudinal sliding movement, a plurality of elongated slots in said bar, one associated with each blade and each receiving a pivot means, and cooperating means on said bar and within each hollow blade for rotating adjacent blades simultaneously in opposite directions between open and closed positions.

7. A volume control device for regulating air movement through registers and the like comprising, a frame, a plurality of damper blades hollow throughout the length thereof and extending between opposed sides of said frame in parallel and adjacent relationship, pivot means mounting each of said blades for rotation about a longitudinal axis substantially midway between the edges thereof, an operating bar mounted at one side of said frame for longitudinal sliding movement, a plurality of elongated slots in said bar, one associated with each blade and each receiving a pivot means, and a plurality of pins on said operating bar spaced apart along the length thereof in staggered relation, each of said pins extending into a hollow blade and each slidable on an interior surface of said blade relatively towards or away from the pivot means therefor, whereby movement of said bar will rotate adjacent blades simultaneously in opposite directions between open and closed positions.

8. A volume control device for regulating air movement through registers and the like comprising, a frame, a plurality of hollow damper blades extending between opposed sides of said frame in parallel and adjacent relationship, each said blade having a substantially circular portion intermediate the longitudinal edges thereof and

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elongated hollow portions at each side of said circular portion, one of said hollow portions on each blade having a relatively thin lip extending outwardly therefrom, pivot means on said frame and extending into the circular portion of each blade, whereby each blade may be rotated about a longitudinal axis, an operating member slidably mounted at one side of said frame, and camming means on said operating member received by the hollow portion of each blade on the side of said circular portion opposite to that on which said lip is located and slidable on an interior surface of each blade relatively towards and away from the pivot means therefor, whereby movement of said operating member will rotate said blades by a cam action simultaneously, adjacent blades being rotated in opposite directions, and the lip of one blade being in abutting relation with the opposite edge of an adjacent blade when in closed position.

9. A volume control device for regulating air movement through registers and the like comprising, a frame, a plurality of hollow damper blades extending between opposed sides of said frame in parallel and adjacent relationship, each said blade having a substantially circular portion intermediate the longitudinal edges thereof and elongated hollow portions at each side of said circular portion, one of said hollow portions on each blade having a relatively thin lip extending outwardly therefrom, the lips on adjacent blades extending in opposite directions, and the opposite edge of each blade being substantially flat, pivot means on said frame and extending into the circular portion of each blade, whereby each blade may be rotated about a longitudinal axis, an operating member slidably mounted at one side of said frame, and camming means on said operating member received by the hollow portion of each blade on the side of said circular portion opposite to that on which said lip is located and slidable on an interior surface of each blade relatively towards and away from the pivot means therefor, whereby movement of said operating member will rotate said blades by a cam action simultaneously, adjacent blades being rotated in opposite directions, and the lip of one blade being in abutting relation with the opposite edge of an adjacent blade when in closed position.

References Cited in the file of this patent

UNITED STATES PATENTS

279,111	Vandervoort	June 5, 1883
397,322	Whitaker	Feb. 5, 1889

FOREIGN PATENTS

502,994	Canada	May 25, 1954
706,388	Great Britain	Mar. 31, 1954