Feb. 24, 1942. J. L. CHILDERS ET AL 2,273,818

AIR FLOW CONTROL DEVICE

Filed April 24, 1939

Fig. 1.

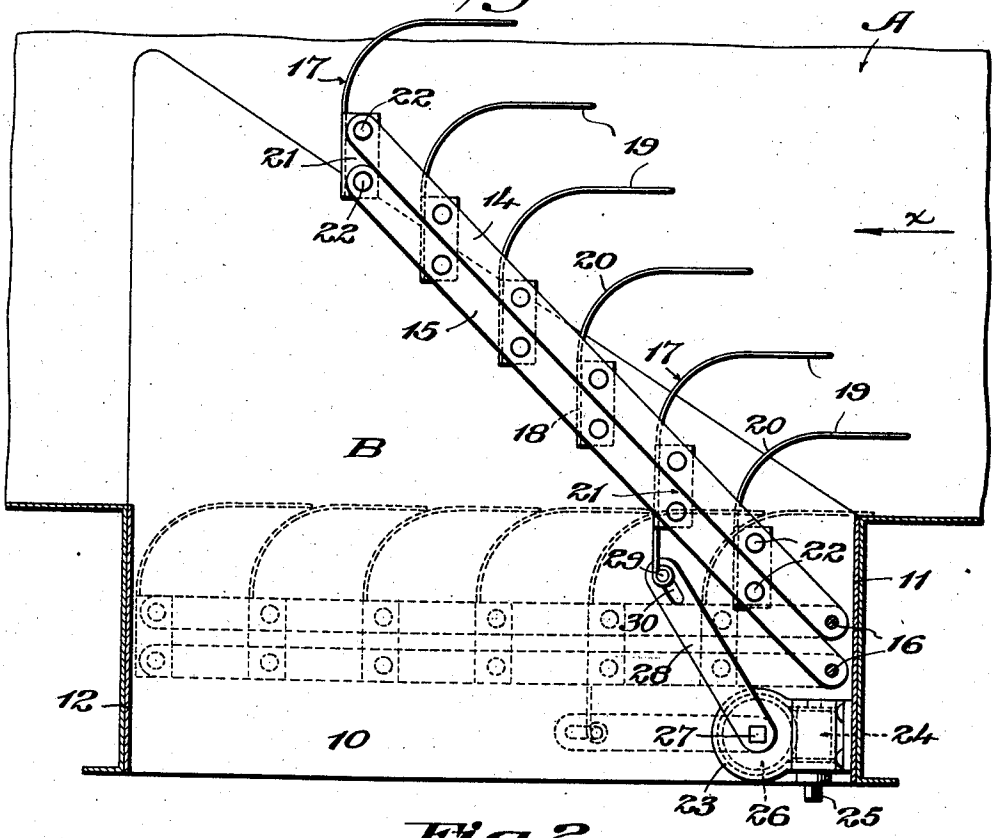


Fig. 2.

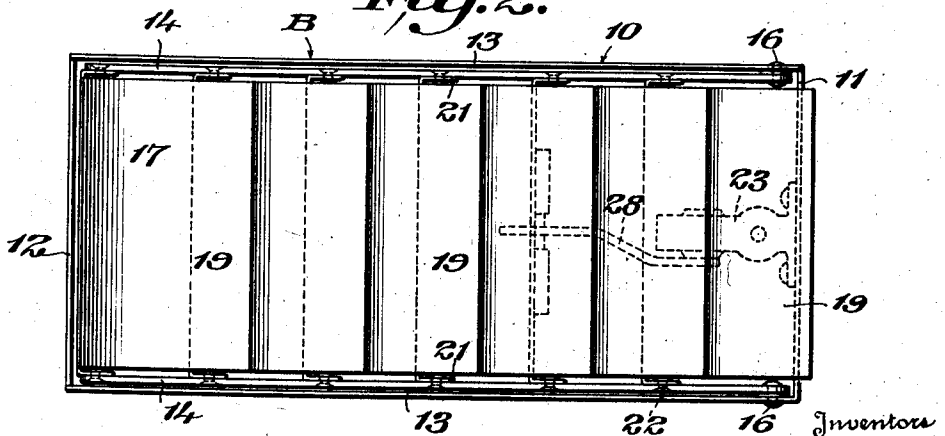
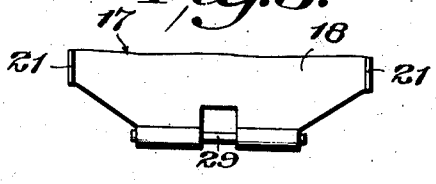


Fig. 3.



Inventors
Joseph L. Childers,
Albert E. Parker,
By Carroll Bailey
Attorney

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AIR FLOW CONTROL DEVICE

Joseph Louis Childers and Albert Edward Parker,
Dallas, Tex.

Application April 24, 1939, Serial No. 269,706

1 Claim. (Cl. 98—40)

This invention relates to the art of supplying warm or cool, fresh or treated air to rooms or other enclosures for heating, cooling, ventilating, air conditioning or other purposes, and has for its general object to provide an air flow control device for association with an air supply duct to regulate the amount of air delivered from the duct through a bottom or side outlet opening therein, and to direct the air through said opening so that there is little loss in velocity of the delivered air and the total volume thereof is distributed substantially uniformly throughout the area of said opening.

Another object of the invention is to provide a device for the purpose stated which is simple in construction, strong, durable and comparatively cheap and easy to produce; which may readily be mounted in operative relationship to an air supply duct; which embodies simple means for the adjustment thereof to regulate the amount of air delivered therethrough, and which is highly efficient in operation.

With the foregoing and other objects in view, which will become more fully apparent as the nature of the invention is better understood, the same consists in a device for the purpose stated embodying the novel features of construction, combination and arrangement of parts as will be hereinafter more fully described, illustrated in the accompanying drawing and defined in the appended claim.

In the accompanying drawing, wherein like characters of reference denote corresponding parts in the different views:

Figure 1 is a longitudinal section through an air flow control device constructed in accordance with one practical embodiment of the invention and showing the device operatively mounted in an air supply duct, open and closed positions of the adjustable air flow control elements of the device being shown by full and dotted lines, respectively.

Figure 2 is a top plan view of the device with the adjustable air flow control elements thereof in closed positions; and

Figure 3 is a detail elevation of the lower portion of one of the air flow control elements.

Referring to the drawing in detail, A designates a portion of an air supply duct having a branch duct *a* extending downwardly therefrom, and B designates, generally, the present device for controlling flow of air from said duct A to and through said branch duct *a*.

The device B comprises a vertically disposed, open-ended casing of rectangular shape in cross section, designated generally as 10, composed of a front wall 11, a rear wall 12, and side walls 13, 13, and in accordance with the invention this casing, which is of a cross sectional size to closely fit within the branch duct *a*, is disposed in said branch duct and fastened therein in any suitable manner with the upper edges of its front and rear walls 11 and 12 disposed preferably, but not necessarily, approximately in the plane of the lower wall of the duct A.

Within the casing 10 at each side thereof is a pair of arms comprising an upper arm 14 and a lower arm 15, and in accordance with the invention these arms are of lengths approximately equal to the length of said casing 10 and at their front ends are pivoted to the side walls 13, 13 adjacent to the front wall 11 by rivets, pins, screws or the like 16 which are vertically alined and suitably spaced apart, whereby said arms are swingable between horizontal positions as shown by dotted lines in Fig. 1 and upwardly and rearwardly inclined positions as shown by full lines in said figure.

Extending transversely of the casing 10 between the two pairs of arms 14, 15 is a series of vanes 17 each comprising a vertically disposed lower end portion 18 and a forwardly directed horizontally disposed upper end portion 19 connected with the lower portion 18 by a curved portion 20 and, as shown, these vanes, of which there may be any desired number, are of width substantially equal to the width of the space between the two pairs of arms 14, 15. At their side edges the vertically disposed lower portions 17 of said vanes are provided with flanges 21, and connecting these flanges with the arms 14, 15 are vertically alined pivots 22 which are vertically spaced apart distances equal to the vertical spacing of the pivotal connections 16 of the front ends of said arms with the casing side walls 13, 13. Accordingly, the arms 14, 15 together with the vanes 17 comprise a parallelogram structure in which the vertical and horizontal lower and upper end portions of said vanes are maintained vertically and horizontally disposed despite swinging of the arms 14, 15.

The vanes 17 may or may not be duplicates of one another, but in any event they are suitably spaced apart along the arms 14, 15, and their horizontal upper end portions 19 are of such lengths, that when said arms 14, 15 are swung to approximately horizontal positions as shown by dotted lines in Fig. 1, their said horizontal upper end portions 19 are disposed in substantially a common horizontal plane and in end to

end relationship so that they cooperate with each other to practically completely close the casing 10 against flow of air therethrough from the duct A. On the other hand, when the arms 14, 15 are swung upwardly, the vanes 17 obviously are caused to become upwardly and rearwardly stepped or echeloned with respect to each other, as shown by full lines in Fig. 1, thereby providing therebetween a plurality of air passageways each comprising a horizontal upper end portion and a vertical lower end portion. Accordingly, air flowing through the duct A in the direction of the arrow x enters the open front ends of the horizontal upper portions of said passageways and by the curved portions 20 of the vanes 17 is directed downwardly through the vertical lower portions of said passageways and through the casing 10 with little loss in velocity. Moreover, since the lower ends of said passageways are alined with different portions of the casing 10 and since substantially equal amounts of air flow through the respective passageways, it is apparent that the total volume of air flowing through the casing 10 is substantially uniformly distributed throughout the area of said casing.

Obviously, the distances between the horizontal portions 19 of the vanes 17 increases as the arms 14, 15 are swung upwardly and decreases as said arms are swung downwardly. Accordingly, by varying the upward and rearward inclination of said arms 14, 15, the amount of air flowing from the duct A through the casing 10 and therefore through the branch duct a may be regulated.

Any suitable means may be employed for swinging the arms 14, 15, but one simple, practical means for this purpose is illustrated in the drawing as comprising a gear housing 23 disposed within the casing 10 at the front end thereof below the arms 14, 15 and suitably fastened to the front wall 11 of said casing 10; a vertically disposed worm 24 in said housing having the lower end portion 25 of its shaft exposed at the bottom of said housing to be engaged by any suitable implement for effecting rotation of the worm; a worm wheel 26 journaled in said housing upon a horizontal shaft 27 and in mesh with said worm; and an arm 28 fixed at one end to said shaft 27 and suitably connected at its other end to one of the vanes 17. Thus, by rotating the worm 24 the worm wheel 26 is rotated and the arm 28 thereby is swung and effects swinging movement of the arms 14, 15. Moreover, the worm and worm wheel serve as a lock to hold said arms 14, 15 in any position to which they may be adjusted.

A suitable connection between the arm 28 and one of the vanes 17 may comprise a pin 29 carried by the lower end portion of the vane in the manner illustrated by way of example in Fig. 3 of the drawing and disposed in a slot 30 provided in the free end portion of said arm 28.

If desired, the vanes 17 may be completely or partly covered by any suitable fabric, felt or the like for sound deadening purposes and to assist sealing cooperation of the vanes with each other when they are in their closed position shown by dotted lines in Fig. 1.

Without further description it is thought that the features and advantages of the invention will be readily apparent to those skilled in the art, and it will of course be understood that changes in the form, proportion and minor details of construction may be resorted to, without departing from the spirit of the invention and scope of the appended claim.

Having described the invention, what is claimed is:

Means for deflecting fluid from a supply duct into a branch duct extending from said supply duct at substantially right angles thereto, said means comprising a self-contained unit including a casing corresponding in cross sectional size and shape to the branch duct to be slipped into the branch duct and fastened therein, said unit further including a plurality of blades having first and second end portions disposed at substantially right angles to each other, the first end portions of said blades being disposed substantially parallel to each other and also substantially parallel to the supply duct when said casing is disposed in the branch duct, the second end portions of said blades being disposed substantially parallel to each other and also substantially parallel to said casing, means mounting said blades in said casing for collective swinging movement between a position in which their first end portions are disposed substantially in alinement with each other transversely across said casing in closing relationship thereto and a position in which their first end portions are disposed in spaced, parallel relationship to each other within the supply duct and their second end portions are alined with said casing when the casing is disposed in the branch duct, so that fluid flowing through the supply duct is deflected by said blades into the branch duct, said mounting means comprising parallel bars pivotally mounted upon said casing and to which said blades are pivoted at spaced points, and actuating means for swinging said bars to move said blades between their said two positions, said actuating means comprising a worm and a cooperating worm wheel mounted upon and within said casing, said worm having means engageable by a suitable implement to effect its rotation thereby to rotate the worm wheel, a longitudinally slotted arm fixed to the worm to be swung by rotation thereof, and a pin carried by one of said blades and extending through the slot in said arm so that swinging of said arm swings said blades.

JOSEPH LOUIS CHILDERS.
ALBERT EDWARD PARKER.