Nov. 3, 1959 B. LÄRKFELDT 2,911,002

FLOW GOVERNOR

Filed Oct. 22, 1956

FIG. 1.

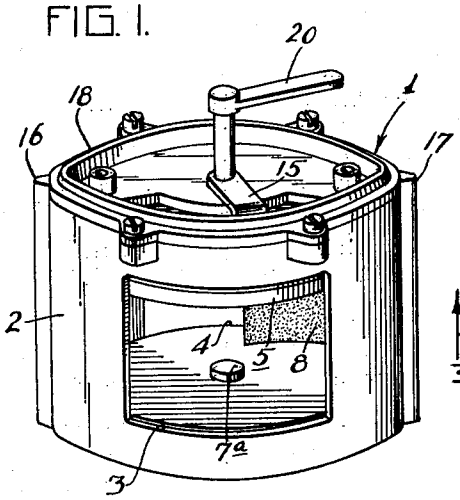


FIG. 2.

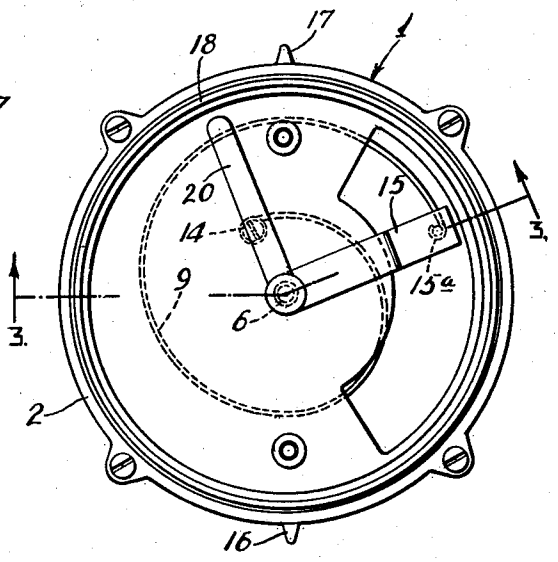


FIG. 3.

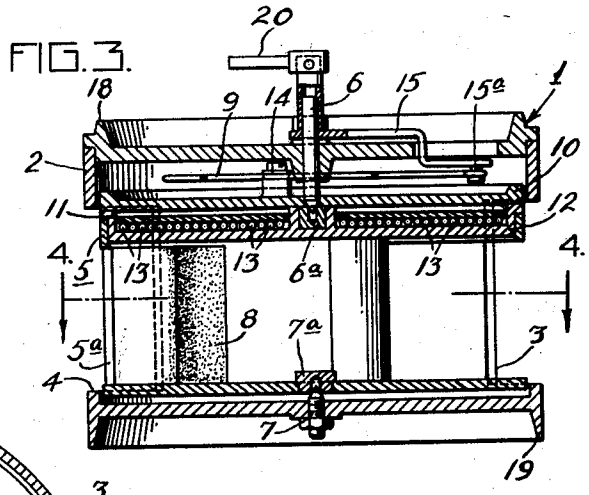
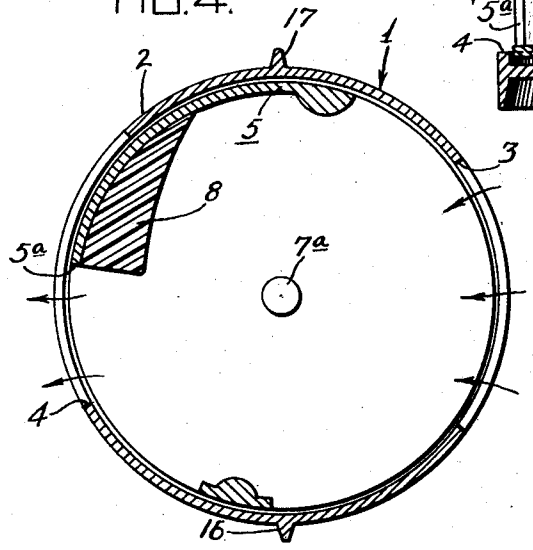


FIG. 4.



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FLOW GOVERNOR

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8 Claims. (Cl. 137—499)

The present invention relates to an apparatus for maintaining a certain, adjustable quantity of a gaseous medium constant. Conventional apparatus of this kind often has proved to cause a disadvantageous noise—especially when mounted in air-conditioning and ventilating plants working with high pressures. Another disadvantage of conventional regulating apparatus of this kind is that they cause a relatively great pressure drop. These disadvantages are substantially eliminated by an apparatus made in accordance with the invention, which apparatus is of a simple but reliable construction.

The apparatus made according to the invention consists of a substantially cylindrical casing, provided with inlet and outlet openings respectively for the gaseous medium in the form of two apertures arranged in opposite sides of the cylindrical surface and a rotatable throttling means concentrically journalled within said casing. The invented apparatus is characterized in that the throttling means consists of an arcuate damper-blade, provided with an inwards directed projection, located at the foremost edge of said damper-blade as reckoned in the direction of its throttling movement and arranged to restrict more or less the outlet opening in response to variations in the difference between the inlet and outlet pressures of the apparatus and against the action of a counter-acting spring, which tends to keep the damper-blade in a predetermined starting position.

Other characteristic features of the invented apparatus will be evident from the claims and the following description.

The invention will now be described more in detail with reference to the accompanying drawing, where

Fig. 1 is a perspective view of an apparatus in accordance with the invention;

Fig. 2 is a plan of the apparatus shown in Fig. 1;

Fig. 3 is a vertical section taken on the line 3—3 in Fig. 2; and

Fig. 4 is a horizontal section taken on the line 4—4 in Fig. 3.

In the drawing **1** designates the complete apparatus, which consists of a cylindrical casing **2** provided with an inlet opening **3** and an outlet opening **4** for the gaseous medium. In the embodiment shown, the openings consist of two rectangular apertures arranged in opposite sides of the cylindrical surface. A rotatable throttling means **5** is concentrically journalled within said casing by means of two stub shafts **6** and **7** and their corresponding centre plate bearings **6***a* and **7***a*. A projection **8** is arranged at the foremost edge **5***a* of the damper-blade. In the illustrated embodiment, the projection consists of a filling-up member having a thickness descreasing from the foremost edge and suitably consisting of a porous sound-deadening material. A spring **9** controls the movements of the damper-blade, one end of the spring being fastened at **14** to the throttling means **5**, while its other end is connected to one end **15***a* of a lever **15** lockable in different positions and being turnable about the same centre as the throttling means **5**. The locking can be performed by an adjustment of an arm **20**, arranged on the shaft **6**. These positions give different positions of equilibrium for the throttling means and thus different values for the passing quantity of gas. Reference numbers **10** and **12** designate double walls at one end of the throttling means. Between these double walls there is arranged an oscillation-deadening means, for instance in the form of a disc **11**, resting against one of the end walls and a plurality of metal balls **13** (shots) being freely movable in the space in said double end wall. The disc or the balls may also be used alone without the other. Two sealing ribs **16** and **17** are situated at diametrical opposite points on the cylindrical surface of the casing and are parallel to the axis of the casing. They are intended for sealing against the walls in the event that the apparatus is to be counted in a rectangular channel or duct. In a similar manner the end walls of the apparatus may be provided with circular sealing ribs **18** and **19** respectively.

In the operation of the device, the inlet opening **3** of the apparatus is connected to a supply duct which may have a given pressure therein. Thus, the chamber is maintained with the static pressure. If there is no flow through the apparatus, the pressure is the same on the leading and trailing surfaces of the projection **8** and the spring **9** causes the damper **5** to move to its fully open position. If air flow occurs through the opening **4**, the flow causes some of the static pressure to be converted to dynamic pressure, and the static pressure drops adjacent the leading surface of the projection **8**. If the flow is sufficiently great, the pressure drop counteracts the force of the spring and causes the throttle to advance towards the closing position. The advance towards the closing position reduces the flow through the opening **4** and therefore reduces the pressure drop to a point where the force resulting from the pressure drop on the leading surface of the projection, as compared to the static pressure of the trailing surface of the projection, precisely balances the force of the spring **9** and equilibrium is obtained. Since the pressure drop is dependent upon the flow, the flow is maintained constant.

What I claim is:

1. A flow governor for maintaining the flow of a gaseous medium at a preselected value comprising a substantially cylindrical casing, diametrically opposite inlet and outlet openings in the cylindrical wall of said casing, an arcuate damper blade conforming in curvature with the curvature of said cylindrical surface, support means in said casing pivotally mounting said blade for rotation about the axis of said casing for movement between a forward limit position in registry with the outlet opening and blocking gas flow through said opening and a rearward limit position out of registry with said outlet opening and affording full flow through said openings, the leading edge of said damper defining one side of outlet opening, bias means connected to said damper blade to bias the blade away from its forward limit position toward a preselected starting position, and an inward projection on the leading edge of said damper, its trailing surface being shielded by the damper blade from the gas flow and thus exposed to the static pressure of the gaseous medium at rest within said casing behind said blade and its leading surface being exposed to the static pressure of the gaseous medium flowing through said outlet opening, said leading surface having an upstream edge which extends further into the medium flowing through said outlet opening than its downstream edge throughout its movement between the forward and rearward limit position, the static pressure of the flowing medium being less than the static pressure of the medium at rest due to the flow through the opening, the difference in static pressures thereby creating a force to displace said damper

against the bias of said bias means toward its forward limit position and away from said preselected starting position to an equilibrium position affording said preselected flow of gaseous medium through said outlet.

2. A flow governor according to claim 1 wherein said support means includes circular end walls rigidly mounted on the arcuate damper blade, one of said end walls comprising double spaced plates, and oscillation-deadening means in the space between said plates.

3. A flow governor according to claim 2 wherein the oscillation-deadening means comprises a disc resting against one of the end walls and turnable about the pivotal axis of the damper blade.

4. A flow governor according to claim 2 wherein the oscillation-deadening means comprises a plurality of metal balls freely movable in said space between the double spaced plates.

5. A flow governor according to claim 2 wherein the oscillation-deadening means comprises a disc resting against one of the end walls and turnable about the pivotal axis of the damper blade and a plurality of metal balls freely movable in said space between the double spaced plates.

6. A flow governor according to claim 3 wherein the projection comprises a wedge-like member of a porous, sound-deadening material and is disposed with its greatest

radial thickness at the leading edge of the damper blade and tapering toward the trailing edge of the blade.

7. A flow governor according to claim 1 including a lever turnable about the pivotal axis of the damper blade and lockable in different positions corresponding with preselected values of gas flow, and wherein the bias means comprises a spiral tension spring, at one end fastened to the damper blade and at the other end connected to said lever.

8. A flow governor according to claim 1 adapted for mounting in a rectangular duct wherein the cylindrical casing is formed with two circular sealing ribs projecting axially outward from the end walls and with two axial sealing ribs projecting radially outward at diametrically opposite points on the cylindrical surface of the casing intermediate said inlet and outlet openings, said ribs constituting means for sealing the casing in the interior of the rectangular duct.

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