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DEVICE FOR REGULATING THE FLOW OF A GASEOUS MEDIUM

Filed Oct. 17, 1955

FIG.1.

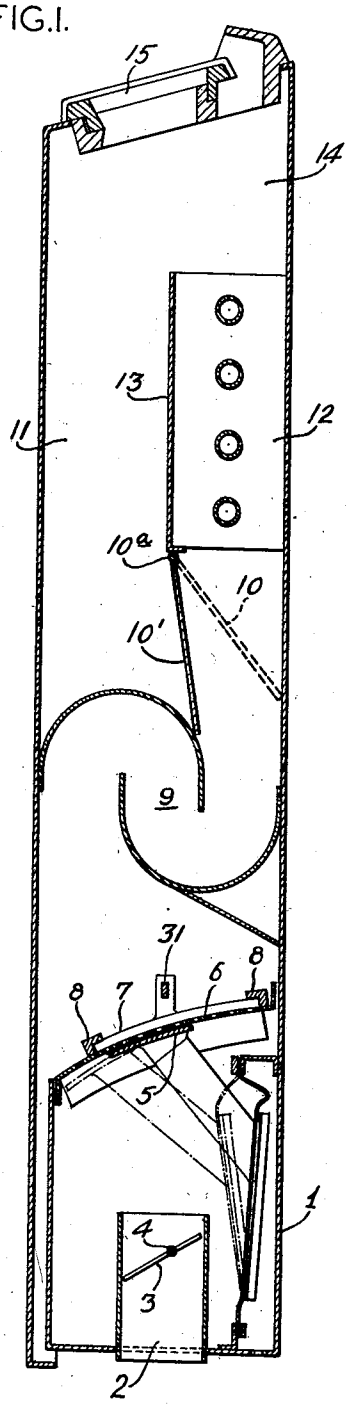
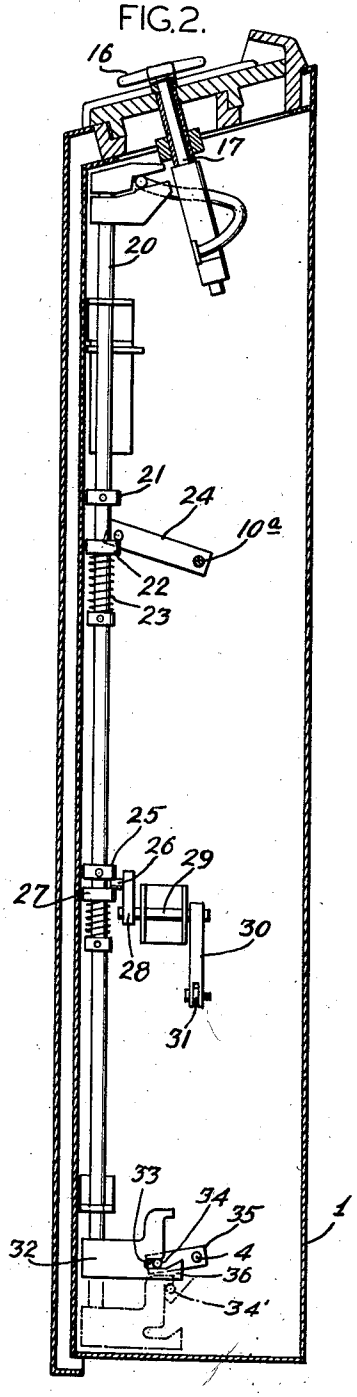


FIG.2.



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DEVICE FOR REGULATING THE FLOW OF A GASEOUS MEDIUM

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Application October 17, 1955, Serial No. 541,009

Claims priority, application Sweden October 20, 1954

7 Claims. (Cl. 137—599)

The present invention relates to a regulating device in a channel, an apparatus or a similar unit provided with treating means for a gaseous medium, for instance a heating medium, and a by-pass arranged side-by-side with said means, and regulating device being intended for simultaneous regulation of the quantity of passing medium as well as the ratio between treated and non-treated medium. The invented device is characterized by in combination a damper swingably arranged at the front edge of a partition between the treating means and the by-pass and a sliding damper co-operating with said swingable damper and by its movement shielding or opening a number of flow passages arranged in a partition crossing the channel, said two dampers being operated by one and the same maneuvering means in such a manner that the area of the passages and thus the medium quantity is reduced as a larger part of the medium is caused to pass through the treating means.

The by-pass may suitably be dimensioned to allow a greater medium quantity to pass than that which can pass through the treating means, the swingable damper thus emphasizes the reduction of the medium quantity as a larger part of the medium is caused to pass through the treating means.

The two dampers may either be made to start or end their movements simultaneously or the sliding damper can be caused to start and/or end its movement in a direction towards a reduction of the medium quantity before the swingable damper has been caused to guide part of the medium through the treating means or after whole the quantity of the medium has been guided through the treating means respectively.

The invented device may often be used when a plurality of apparatus are connected to a common distributing duct for the medium. In such cases it is often desirable that the medium quantity being adjusted by means of the invented regulating device is maintained constant by means of a volume governor arranged in front of the sliding damper. Such a governor may suitably be made in accordance with my patent application Serial No. 540,947, filed October 17, 1955, the partition indicated in said patent application in such a case being constituted of the above mentioned partition shielded by the sliding damper.

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

Fig. 1 shows a cross section through an apparatus, provided with the invented regulating device.

Fig. 2 shows a suitable embodiment of means for maneuvering the regulating dampers.

In Fig. 1, **1** designates an apparatus provided with an inlet **2** for the medium. In the inlet **2** there is arranged a throttle **3**, which throttle is turnable about an axle **4**. **5** designates a volume governor of a design known per se. **6** designates a partition arranged across the apparatus and provided with one or more apertures. The size of the effective area of the apertures is regulated by means of a damper **7** slidably movable perpendicularly with

respect to the cross section plane and guided by the rails **8**. The apparatus may suitably be equipped with a sound trap within the apparatus, said trap being of a design known per se. In the drawing an embodiment of such a sound trap is designated **9**. Above the sound trap the apparatus is divided by means of a partition **13** into a space for a treating means **12** and a by-pass **11**. The ratio between treated and by-passed non-treated medium is regulated by means of a damper, which damper is illustrated in the drawing in broken lines **10** in a position where the treating means is cut off, and in full lines **10'** in a position where the by-pass is closed. The damper is swingable about an axle **10*a***. Said damper can, of course, also be put in any intermediate position. The medium passing the treating means and/or the by-pass enters a mixing chamber **14**, from which it continues through the grill **15**.

In such cases on the other hand, when the invented regulating device is used in a channel or ventilating duct the integral parts have the same position and design with the exception of the inlet and outlet openings.

In Fig. 2, **16** designates a knob for the maneuvering of the regulating device. The knob is fastened to shaft **17** equipped with a screw-thread made of heavy wire. This thread is arranged to engage a groove of a catching means fastened to a rod **20**. **21** and **22** designate likewise catching means, the upper one of which **21** being fixed and the lower one being movable and counteracted by a spring **23**. These catching means engage a lever **24** fastened to the axle **10*a*** of the above mentioned swingable damper **10**. In the same manner there are two catching means **25** and **27** for the movement of the sliding damper **7** which means actuate a pin **26** of a lever **28**. Said lever is pivoted about the axle **29**, in the other end of which there is still another lever **30** which by means of a link **31** is connected with said sliding damper **7**. For adjustments of the throttle **3** there is a lever **35** arranged on the axle **4** of said throttle, which lever **35** is equipped with a pin **34** which engages a groove **33** of a catching means **32** fastened to the lower part of the said rod **20**. By the movements of said catching means downwards the pin **34** is moved to a position **34'**, where it is released from the catching means. By the reversal movement the pin **34** is caught by a projecting part **36** of the catching means **32**.

In the operation of the illustrated embodiment of the invention, when the regulating rod **20** is in its upper limit position, the throttle **3** is closed, the damper **10** is in the position **10'** (the passage through the element **12** being fully open), and the damper **7** is in its most shielding position. When the rod **20** is moved downwards, the throttle **3** is first fully opened, and is held in this position, the damper **7** is then gradually actuated toward a less shielding position, and the damper **10**, owing to the action of the spring **23**, is held in the position **10'**. At the end of the downward movement of the rod **20**, the stop **21** engages the lever **24** to gradually move the damper **10** toward the position shown in broken lines, whereby the bypass is gradually opened.

I claim:

1. In a device for regulating the flow of a gaseous medium, comprising means defining a channel having an inlet at one end and an outlet at the other end, partition means extending longitudinally in one portion of said channel forming a main passage and a by-pass passage connected in parallel, means in said main passage to treat the medium flowing therethrough, proportioning means at one end of said partition means to proportion the flow of medium between said passages and thereby control the ratio of between treated and non-treated medium comprising a damper movable between a first limit position directing the flow of medium entirely through said by-

pass passage and a second limit position directing the flow of medium entirely through said main passage; a transverse partition disposed in another portion of said channel and having apertures therein forming flow passages in series relation to said parallel-connected passages; and a sliding damper operable between a first position fully opening said flow passages and a second position closing said flow passages to thereby regulate the total flow of medium through said channel; a common operator for said dampers to move them concurrently towards the first and second positions thereof respectively whereby a decrease in the ratio of treated medium to non-treated medium is accompanied by an increase in total flow, and, vice versa, an increase in said ratio is accompanied by a decrease in total flow.

2. A device according to claim 1 wherein said by-pass passage is dimensioned to cause a lesser resistance to the flow of medium therethrough than said main passage containing said treating means, whereby movement of the damper of said proportioning means contributes to the effect of the concurrent movement of said slidable damper upon the total flow of medium.

3. A device according to claim 1 wherein said control means initiates operation of said sliding damper prior to initiating operation of said proportioning damper from their first positions towards their second positions.

4. A device according to claim 1 wherein said control means terminates operation of said sliding damper after

terminating operation of said proportioning damper from their first positions to their second positions.

5. A device according to claim 1 including a volume governor disposed in said channel between said inlet and said dampers to maintain the quantity of medium entering said inlet substantially constant at the flow rate determined by said dampers.

6. A device according to claim 5 wherein said sliding damper and transverse partition are positioned adjacent said inlet, and wherein further said volume governor comprises a membrane having a stiffening disc thereon, means pivotally mounting said disc adjacent said inlet for pivotal movement in response to changes in the static pressure at the inlet of said channel, and a damper plate engaging said transverse partition and connected to said membrane and disc for movement therewith across the flow passages of said transverse partition to regulate the area of the latter in accordance with said pressure at the inlet.

7. A device according to claim 1 wherein said treating means in said main passage comprises a heating element.

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