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(54) IMPROVEMENTS IN FLAP VALVES

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 SCHAFT MIT BESCHRANKTER HAFTUNG, a
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 5 Republic of Germany, do hereby declare
 the invention, for which we pray that a
 patent may be granted to us, and the
 method by which it is to be performed, to
 be particularly described in and by the
 10 following statement:—

The invention relates to a valve device
 for controlling volumetric flow through a
 duct e.g. air flow in air-conditioning
 installations.

15 If a valve flap is pivotably disposed in
 an air duct with its rotary axis passing
 through the centre of the flap, the flap is
 subject to a consequent torque which
 moves the flap into the closed position.
 20 This torque acting in the closing direction
 is produced by the asymmetric position of
 the stagnation point on the outflow side of
 the flap and the asymmetric turbulence re-
 gion on the discharge side of the flap.

25 In order to assist control of the flap
 position externally and thereby achieve the
 simplest construction it is, however, desir-
 able for the flap to have a natural tendency
 to assume the open position.

30 In published German specification
 (Offenlegungsschrift) No. 24 17 745, a rotat-
 ably journaled plate is proposed whose
 pivotal axis is spaced from the central
 axis of the plate. Thus, the pressure of the
 35 air flow through the duct acts in such a
 manner upon the plate that it pivots in an
 opening direction. However, particularly
 with circular or oval duct cross-sections, it
 has proved impossible to pivot the flap out

40 of the closed position about an eccentric
 axis of rotation in an opening direction.
 For this reason, a further possibility of
 achieving this opening movement of the
 flap is already indicated in the above-
 45 mentioned publication. There it is proposed
 to connect the plate by a linkage to a
 control element in such a manner that the
 weight of the linkage moves the plate into
 its open position. With such a construction,
 50 however, it has proved disadvantageous that

the opening moment is always independent
 of the volume of air.

The aim of the invention is therefore
 to provide a valve device for controlling a
 volume flow through a duct wherein a flap 55
 is disposed in the duct and pivots in an
 opening direction when acted upon by air,
 said flap being able to have in particular
 a circular or oval cross-section.

In accordance with the present invention 60
 there is provided a valve device for con-
 trolling volumetric flow through a duct com-
 prising a flap pivotably disposed in a duct
 section the flap having a pivotal axis dis-
 posed substantially centrally of the duct 65
 section with one segment of the flap at one
 side of the pivotal axis shorter than the
 other segment at the other side of the
 pivotal axis so that the fluid to be controlled
 acts on the flap to bias it in an opening 70
 direction, the shorter flap segment in its
 closed position co-operating with a shelf
 which projects into the duct section to close
 the duct.

By suitably selecting and positioning the 75
 segments or wings of the flap in the through
 flow duct section, a torque is applied to the
 flap to cause the flap to open.

It is important particularly for ducts of
 circular cross-section that the flap is 80
 journaled substantially centrally in the
 duct section, since in this case rotation
 about an eccentrically journaled axis of
 rotation is not possible.

It is also proposed to dispose the flap in 85
 such a manner in the duct section that in a
 closed position it is at an acute angle to the
 longitudinal axis of the duct in particular
 this acute angle is preferably 40°.

The invention is further described, by 90
 way of example, with reference to the
 accompanying drawings, in which:—

Fig. 1 is a longitudinal section through a
 duct having a circular cross-section and
 having a flap disposed therein; and 95

Fig. 2 is a side view of the duct, seen
 in an approach flow direction.

Fig. 1 shows a section of the duct 1.
 The duct contains a pivotably journaled
 flap 2a, 2b whose rotary axle 3 extends 100

diametrically through the centre of the duct 1. As illustrated, the flap 2a,2b has assumed the closed position. The flap segment 2b is shown with its lower edge lying 5 against a shelf or, crosspiece 4 and the remaining flap edge adjoins the interior wall of the duct 1. The flap 2a,2b when closed as shown, is at an acute angle to the longitudinal axis of the duct 1, this angle 10 being about 40° in the illustrated embodiment. The oncoming flow comes from the direction designated 5. Since the lower segment 2b of the flap is shorter than the upper segment 2a, because of the differing 15 surfaces of pressure application a torque acts upon the axle 3 and pivotally biasses the flap in its opening direction.

Fig. 2 shows the duct 1 of circular cross-section as seen in the oncoming flow 20 direction 5. Extending through the centre of the duct 1 is the axle 3 to which the flap 2a,2b is rigidly connected. In a closed position, it lies with its lower edge against the segmental cross-piece 4. The flap axle 25 3 is led outwards through the duct so that it is possible to attach control devices externally of the duct.

WHAT WE CLAIM IS:—

1. A valve device for controlling volumetric flow through a duct, comprising a 30 flap pivotably disposed in a duct section the flap having a pivotal axis disposed substantially centrally of the duct section

with one segment of the flap at one side of the pivotal axis shorter than the other 35 segment at the other side of the pivotal axis so that the fluid to be controlled acts on the flap to bias it in an opening direction, the shorter flap segment in its closed position co-operating with a shelf which 40 projects into the duct section to close the duct.

2. A device as claimed in claim 1, in which the flap in a closed position extends at an acute angle to the longitudinal axis 45 of the duct section.

3. A device as claimed in claim 2, in which the flap in a closed position lies at an angle of approximately 40° to the duct axis. 50

4. A device as claimed in any preceding claim in which the duct section is circular in cross section.

5. A device as claimed in any preceding claim which is installed in an air- 55 conditioning or ventilating system.

6. A valve device for controlling volumetric flow constructed and adapted to operate substantially as herein described with reference to and as illustrated in the 60 accompanying drawings.

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COMPLETE SPECIFICATION

1 SHEET

*This drawing is a reproduction of
the Original on a reduced scale*

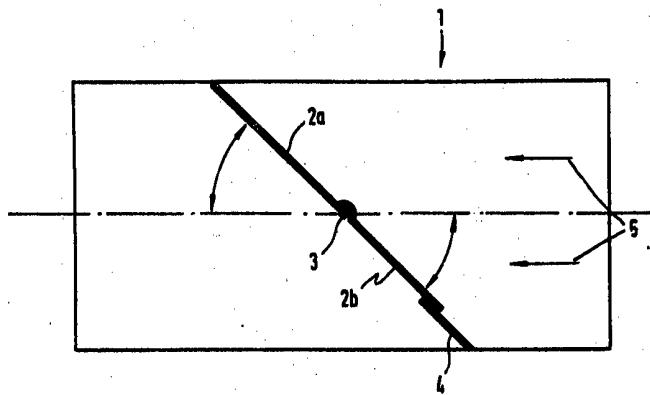


Fig.1

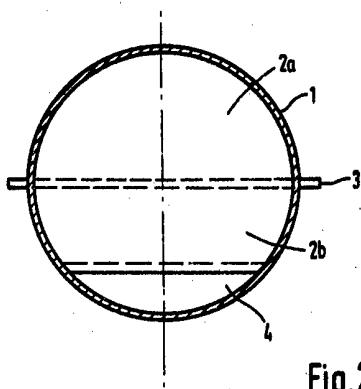


Fig.2