A ventilation damper assembly with a number of parallel and rotatable rectangular damper blades.

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Description

This invention relates to a ventilation damper assembly to be mounted in a cabinet, a ventilation duct or a wall opening and comprising a number of substantially rectangular damper blades of wing-shaped cross-sectional profile mounted rotatably with parallel axes of rotation between opposite frame members in a substantially rectangular damper frame, and wherein said opposite frame members are provided with bearings for journals secured in the damper blades, said journals being in engagement with a drive mechanism by which the damper blades can be moved between a closing portion and an opening position.

Dampers of this type are used particularly as air volume control and damping means as well as mixing dampers when mounted in ventilation ducts of rectangular cross-section or in wall openings or openings in side walls or end walls of cabinets, for instance for air conditioning control units in air conditioning systems. Beyond a reliable closing function with respect to tightness and a movement of the damper blades which as far as possible is free from play and noise it is a purpose to create a simple and sturdy design of such damper blades with the lowest possible costs of production.

To obtain sufficient tightness in the closing position known dampers of the above mentioned kind are usually provided — beyond tightening strips along the longitudinal edges of each damper blade — with special, lateral tightening members secured to said frame members, such as disclosed in DE—A—2,342,531 and in CA—A—804,873, but thereby the damper construction is made considerably more complicated and expensive.

From GB—A—1085492 it is known to provide blades of adjustable louvres with a U-shaped holder or clip fixed to the end of a blade to be resiliently compressible towards the blade in order to allow turning of the blade relative to a jamb of a metal window frame on which a continuous protruding beading is formed to make the louvre weather tight when closed.

From GB—A—2033381 and US—A—378378 it is known to provide the outer contours of opposite sides of frame members facing the flow area of a damper with a separate resilient lining or a flexible spring-like member with a substantially convex cross-sectional shape, whereby the minimum distance between the frame members will be aligned with the axes of the damper blades.

It is an object of the invention to provide for most applications a sufficiently reliable, lateral tightness in a simple manner without using particular tightening or lining members and without noticeably reducing the movability of the damper blades. According to the invention the damper assembly of the kind set forth is characterized in that the opposite sides of said frame members facing the flow passage area of the damper has a substantially convex cross-sectional shape with the minimum distance between the frame members aligned with the bearings of the journals of the damper blades, and in that the end portions of each damper blade comprise a curved edge portion facing the frame members.

By this construction each damper blade is in its closing position caused to tightly engage said frame members throughout the length of said end portions, while outside the closing position there is only a punctiform engagement between the end portions of the damper blade and said two frame members, the two engagement points being diatomatically opposite on either side of the bearings for the journals of the damper blades. During the movement of the damper blade said engagement points follow a circular path around the bearing.

According to the invention the substantially convex cross-sectional shape may be obtained by providing the frame members with slight bendings in relation to a plane along parallel bending lines delimiting a central strip of a width corresponding to the diameter of the bearings for the journals of the damper blades.

Tests have shown that in connection with ordinary, longitudinal tightening lobes on the damper blades the present invention provides for achieving in the closing position a leakage tightness of the same magnitude as that obtained by separate lateral tightening members on the frame members.

In the following the invention is explained in detail with reference to the schematic drawings, in which

Figs. 1 and 2 illustrate an embodiment of a ventilation damper assembly according to the invention, in a view perpendicular to the flow passage area and in a perspective view, resp., while Figs. 3 and 4 illustrate two longitudinal sections perpendicular to each other of the portion of a damper blade in the damper assembly in Figs. 1 and 2 engaging a frame member in the damper frame.

The damper assembly shown in Figs. 1 and 2 is mounted in a rectangular, in the present case almost square damper frame comprising frame members 1 to 4 made from bent sheet profiles of a substantially flat, U-shaped cross-section, so that either frame member as shown at 5 and 6 for the frame member 1 is provided with edge flanges to secure the damper frame either to a ventilation channel having the same flow passage area and cross-sectional shape, to a wall opening or to an opening in the side or end wall of a cabinet, for instance a central unit in an air conditioning system in which one or more fans, air humidifiers, filters and/or heating members may be located.

In the illustrated embodiment four damper blades 7 to 10 of wing-shaped, cross-sectional profile are rotatably mounted in the damper frame with parallel axes of rotation between the two opposite lateral frame members 1 and 2, a journal 12 being inserted in an end portion 11 at
either end of each damper blade, said journal being positioned with sliding fit in a bushing 13 drawn up in the sheet blank of the frame member as shown in Figs. 3 and 4. To neutralize sheet deformation around the drawn bushings, linings made from a hard plastic, for instance nylon, may be mounted in said bushings.

In Figs. 1 and 2 the damper blades 7 and 10 are shown in a central position between a closing position in which the damper blades extend transverse to the flow direction and block the flow passage area, and an opening position in which they are substantially parallel to the flow direction.

The operation of the damper blades 7 to 10 is effected by means of an arm 14 secured to the journal 12 for one of the damper blades 7, and the damper blades 7 to 10 are interconnected with respect to movability through a drive mechanism, including a coupling bar 15, a pivot arm 16 positioned behind the coupling bar 15 being rotatably connected with the coupling bar 15 and secured to one of the journals for each damper blade.

According to the invention, to obtain lateral tightness of the damper blades 7 to 10 in the closing position of the damper assembly the opposite sides of the lateral frame members 1 and 3 facing the flow passage area have a substantially convex cross-sectional shape as shown in Fig. 3 with the minimum distance between the frame members 1 and 3 aligned with the bearing bushings 13 for the journals 12 of the damper blades 7 to 10, in addition to which the end portion 11 of the damper blade has a curved edge portion 11a facing the frame members as set forth in Fig. 4. In the illustrated embodiment the substantially convex cross-sectional shape is obtained by slightly bending a plane frame member along parallel bending lines 17 and 18, delimiting a central striplike portion of a width corresponding to the diameter of the drawn bushings 13.

In the closing position illustrated in Fig. 4 the curved edge portions 11a of the end portions 11 tightly engage the central portion of the frame member 1 opposite the bearing bushings 13 so as to obtain for most applications a sufficient security against air passing through between the end of the damper blades 7 to 10 and the frame members without using any particular tightening means.

Said lateral tightness is simultaneously obtained without considerably reducing the movability of the damper blades, inasmuch as each damper blade as soon as it has been slightly moved away from the closing position as shown in Fig. 3 will get clear of the frame member on the major part of the length of the end member due to the convex cross-sectional shape of the frame member. As a consequence of the curved edge portion 11a of the end portion 11 there are substantially only punctiform engagements between the end portion 11 and the frame member 1 in the two engagement points positioned diametrically opposite on either side of the bearing bushing 13. During the movement of the damper blade between its closing position and its opening position said engagement points will follow a circular path around the bearing bushing.

The above mentioned bendings 17 and 18 to obtain the substantially convex cross-sectional shape of the frame member 1 may for instance be made so that the clearance between the frame member and the end portion 11 of the damper blade in its opening position varies from approximately 0 to 2 mm.

Claims

1. A ventilation damper assembly to be mounted in a cabinet, a ventilation duct or a wall opening and comprising a number of substantially rectangular damper blades (7—10) of wing-shaped cross-sectional profile mounted rotatably with parallel axes of rotation between opposite frame members (1, 3) in a substantially rectangular damper frame, and wherein said opposite frame members (1, 3) are provided with bearings (13) for journals (12) secured in the damper blades (7—10), said journals being in engagement with a drive mechanism by which the damper blades (7—10) can be moved between a closing position and an opening position, characterized in that the opposite sides of said frame members (1, 3) facing the flow passage area of the damper have a substantially convex cross-sectional shape with the minimum distance between the frame members (1, 3) aligned with the bearings (13) of the journals (12) of the damper blades (7—10), and in that the end portions (11) of each damper blade comprise a curved edge portion (11a) facing the frame members (1, 3).

2. A ventilation damper assembly according to claim 1, characterized in that the substantially convex cross-sectional shape is obtained by providing the frame members (1, 3) with slight bendings in relation to a plane along parallel bending lines (17, 18) delimiting a central strip of a width corresponding to the diameter of the bearings (13) for the journals (12) of the damper blades (7—10).

Patentansprüche

1. LüftungsdrosselEinrichtung zum Einbau in ein Gehäuse, einen Lüftungskanal oder eine Wandöffnung, umfassend eine Anzahl im wesentlichen rechteckiger Drosselklappen (7—10) mit flügelförmigem Querschnittsprofil, welche Drosselklappen mit parallelen Rotationssachsen zwischen einander gegenüberliegenden Rahmen teilen eines im wesentlichen rechtseckigen Drosselrahmens drehbar angeordnet sind, welche einander gegenüberliegenden Rahmen teile (1, 3) mit Lagem (13) für in den Drosselklappen (7—10) befestigten Drehzapfen (12) versehen sind, die mit einem Antriebsmechanismus in Eingriff stehen, mittels welchem die Drosselklappen...
Revendications

1. Registre de ventilation pour montage dans un coffret, une gaine d’aération ou une ouverture d’un mur et comprenant un nombre de clapets (7—10) essentiellement rectangulaires dont la forme en coupe est celle d’une aile et qui sont montés à rotation, les axes de rotation étant parallèles, entre des pièces de cadre opposées (1 et 3) dans un cadre de registre essentiellement rectangulaire et dans lequel lesdits pièces de cadre opposées (1 et 3) sont pourvues de paliers (13) pour des tourillons (12) fixés dans les clapets de registre (7—10), lesdits tourillons étant en prise avec un mécanisme de commande à l’aide duquel les clapets de registre (7—10) peuvent être manœuvrés entre une position de fermeture et une position d’ouverture, caractérisée en ce que les côtés desdites pièces de cadre (1 et 3) qui sont orientés vers l’orifice de passage de l’air ont, en coupe, une forme essentiellement convexe avec la plus faible distance entre les pièces de cadre (1 et 3) alignée avec les paliers (13) des tourillons (12) des clapets de registre (7—10), et en ce que les extrémités (11) de chaque clapet de registre comportent une arête arrondie (11a) face aux pièces de cadre (1 et 3).

2. Registre de ventilation selon la revendication 1, caractérisé en ce que la forme en coupe essentiellement convexe est obtenue en courbant légèrement les pièces de cadre (1 et 3) par rapport à un plan le long des lignes de courbure parallèles (17 et 18) délimitant une bande centrale d’une largeur qui correspond au diamètre des paliers (13) des tourillons (12) des clapets de registre.