

(19)



Europäisches Patentamt

European Patent Office

Office européen des brevets



(11)

EP 0 754 916 A2

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
22.01.1997 Bulletin 1997/04

(51) Int Cl.⁶: **F23L 13/02**(21) Application number: **96660033.0**(22) Date of filing: **20.06.1996**

(84) Designated Contracting States:
DE DK ES FR GB SE

(72) Inventor: **Junkkarinen, Pekka**
41330 Vihtavuori (FI)

(30) Priority: **22.06.1995 FI 953118**
21.09.1995 FI 954454

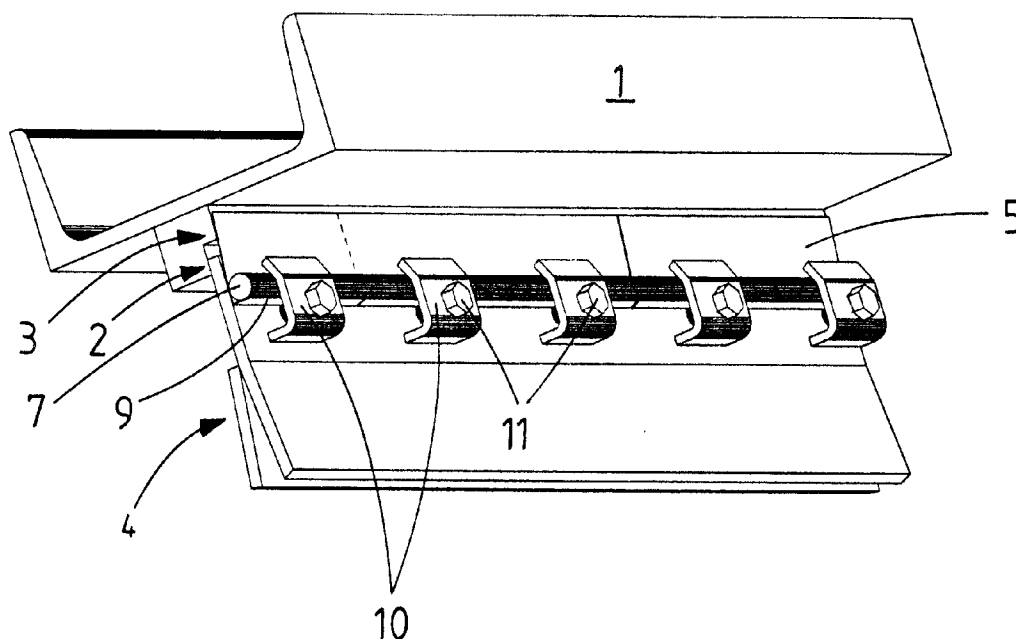
(74) Representative: **Helke, Kimmo Kalervo**
Kespat Oy,
P.O. Box 601
40101 Jyväskylä (FI)

(71) Applicant: **SAMMET DAMPERS OY**
41310 Leppävesi (FI)

(54) A damper for use in flues and air ducts

(57) The object of the invention is damper for use in flues and air ducts, which includes a frame (1) with two stop edges and a hatch (4) component that rotates in relation to this and is equipped with two sealing edges, which press against the stop edges when the damper closes and form two in-line shutoff edges (2, 3). The inner shutoff edge (2) is formed of essentially rigid stop

and sealing edges and the other shutoff edge (3) is formed of at least one flexible blade (5, 6) and a stiff stop edge (3.1) in the frame (1). The flexible blade (5, 6) is secured to the hatch part (4) in such a way that a ridge (9) is formed in the edge of the flexible blade and that the hatch part further includes a rod (7) arranged to press against this, which locks the ridge (9) against bolts (11), or another similar stop.

**FIG. 3****EP 0 754 916 A2**

Description

The object of the invention is a damper for use in flues and air ducts, which includes a frame with two stop edges and a hatch part that rotates in relation to this and is equipped with two sealing edges, which press against the stop edges when the damper closes and form two in-line shutoff edges, between which the shutoff gases can be led and in which the inner shutoff edge is formed of essentially rigid stop and sealing edges and the other shutoff edge is formed of at least one flexible blade and a stiff stop edge in the frame.

A shutoff damper according to the introduction is known from Finnish utility model number 1671, which also shows various other shutoff dampers. According to the state of the art, sealing blades manufactured from spring steel sheet are attached to the hatch part by means of a flat iron bar in such a way that the bolts penetrate both the flat iron bars and the spring steel blades. A construction of this type is difficult in terms of manufacturing technique and, due to thermal expansion, causes problems at high operating temperatures. The problems in manufacturing technique are due to the fact that it is difficult to make holes in a spring steel blade, while holes the same distance apart must also be made in the aforementioned flat iron bar.

This invention is intended to remove the aforementioned drawbacks and create, in a simple manner, a shutoff damper suitable for high operating temperatures. The characteristics of the invention are described in the accompanying Patent Claims. The construction according to the invention permits movement due to thermal expansion, without the flexible sealing blade warping and breaking the seal. Other advantages and embodiments of the invention are described in connection with the following examples of applications.

In what follows, the invention is described by reference to the accompanying Figures, which show one shutoff damper according to the invention and its details.

- Figure 1 shows the damper from the direction of the duct.
 Figure 2 shows a cross-section of the damper in Figure 1 and a partial enlargement of the sealing edge.
 Figure 3 shows an axonometric view of the sealing edge.

In the version of the shutoff damper shown here, frame 1 is divided into three sections, with a hatch 4 in each of them. These are connected to the frame component by means of axle 15 and can be rotated using a conventional mechanism. Sealing devices, which correspond to the stop edges in the frame, are located in the edges of hatch part 4. According to the partial enlargement in Figure 2, frame 1 includes stop edges 2.1 and 3.1, between which there is an air duct 12 placed to lead the shutoff air to the intermediate space. In hatch com-

ponent 4 has a sealing blade 5 of spring steel sheet fixed to it and on top of this a second spring steel blade 6 set to press against it, thus providing more pressure on the sealing edge. The first sealing edge 2 is formed in a known manner of a stop edge 2.2 in the frame and a sealing edge 2.1 in the hatch component 4. These do not bend more than the extent to which the stiff metal plate gives way. Here the thickness of the blade is typically 5 mm. Naturally, the thickness of the blade can vary in individual cases. The second shutoff edge 3 is also formed in what is, as such a known manner, of a rigid stop edge 3.1 in the frame and a flexible sealing blade 5 attached to the hatch, which forms a corresponding sealing edge 3.2. The sealing blade and the spring plate 6 on top of it are made from some suitable spring steel sheet, e.g. Inconell®. The second shutoff edge is stepped in a known manner so that a suitable tension arising in spring blade 5, when the first shutoff edge 2 is closed.

In a known manner, the width of the shutoff duct in the direction of the hatch section is 10 - 20 mm and the steps are 2 - 5 mm.

Here the sealing blade 5 and the spring blade 6 have ridges 9 on one side, by means of which they are attached to hatch part 4. Bar 7 can easily be set into the angle formed by the ridge, and presses plates 5 and 6 against bolts 11. Bar 7 is wedged into place with the aid of clip 10, which is in turn attached to the hatch section with the aid of bolt 11 and nut 12. The interval between the clips 10 is 2,0 - 4,0 times the size of the flexible part of blade 5. The diameter of bar 7 is 1,0 - 2,0 times the height of the ridge.

According to Figure 3, there are clips 10 at regular intervals holding bar 7 in place. Here it is advantageous to use a round rod, so that it only makes contact with spring blade 6 as a thin line. This permits the longitudinal movement of the blades due to thermal expansion, while they still retain their shape. For very high operating temperatures, the edge of the entire hatch section is covered with parts, when the lengths of short sections of blades 5 and 6 may be, e.g. 500 mm, and the distance between the sequential plates 1 - 1,5 mm. In addition, sealing blade 5 and spring blade 6 are mutually overlapped in such a way that their breaks occur at different places.

In one example, blades 5 and 6, which were 50 mm wide, before the ridges were formed, and 500 mm long were used. The clips 10 were at intervals of 110 mm and the diameter of the round rod was 12 mm.

Claims

1. A damper for use in flues and air ducts, which includes a frame (1) with two stop edges and a hatch (4) component that rotates in relation to this and is equipped with two sealing edges, which press against the stop edges when the damper closes and

form two in-line shutoff edges (2, 3), between which the shutoff gases can be led and in which the inner shutoff edge (2) is formed of essentially rigid stop and sealing edges and the other shutoff edge (3) is formed of at least one flexible blade (5, 6) and a stiff stop edge (3.1) in the frame (1), characterized in that the flexible blade (5, 6) is secured to the hatch part (4) in such a way that a ridge (9) is formed in the edge of the flexible blade and that the hatch part further includes a rod (7) arranged to press against this, which locks the ridge (9) against bolts (11), or another similar stop.

2. A damper in accordance with Patent Claim 1, characterized in that the bar (7) is secured to the hatch part (4) at regular intervals by clips (10), which are locked to the hatch part by means of the aforesaid bolts (11).
3. A damper in accordance with Patent Claim 2, characterized in that the interval between the clips (10) is 2,0 - 4,0 times the dimension of the flexible part of the blade (5, 6).
4. A damper in accordance with Patent Claims 1 or 2, characterized in that the hatch part includes two flexible blades (5, 6) set on top of one another, which are each formed of a series of pieces one after the other at the edge, and which are overlapped in relation to each other so that the breaks are located at different locations in relation to each other.
5. A damper in accordance with one of the above Patent Claims 1 - 4, characterized in that the bar (7) is a round rod, with a diameter 1,0 - 2,0 times the height of the ridge.

40

45

50

55

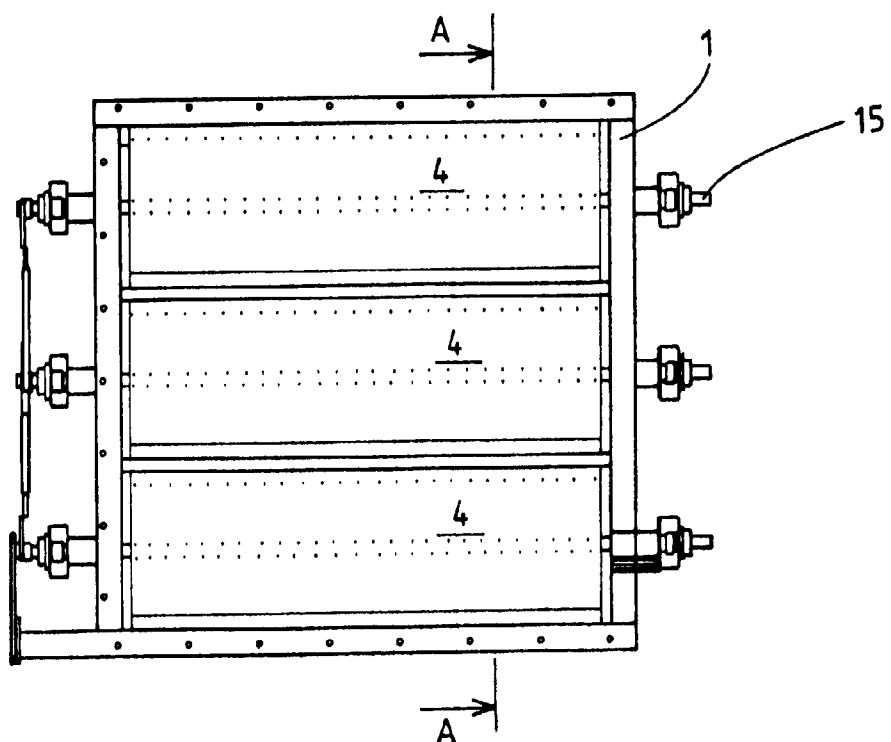


FIG. 1

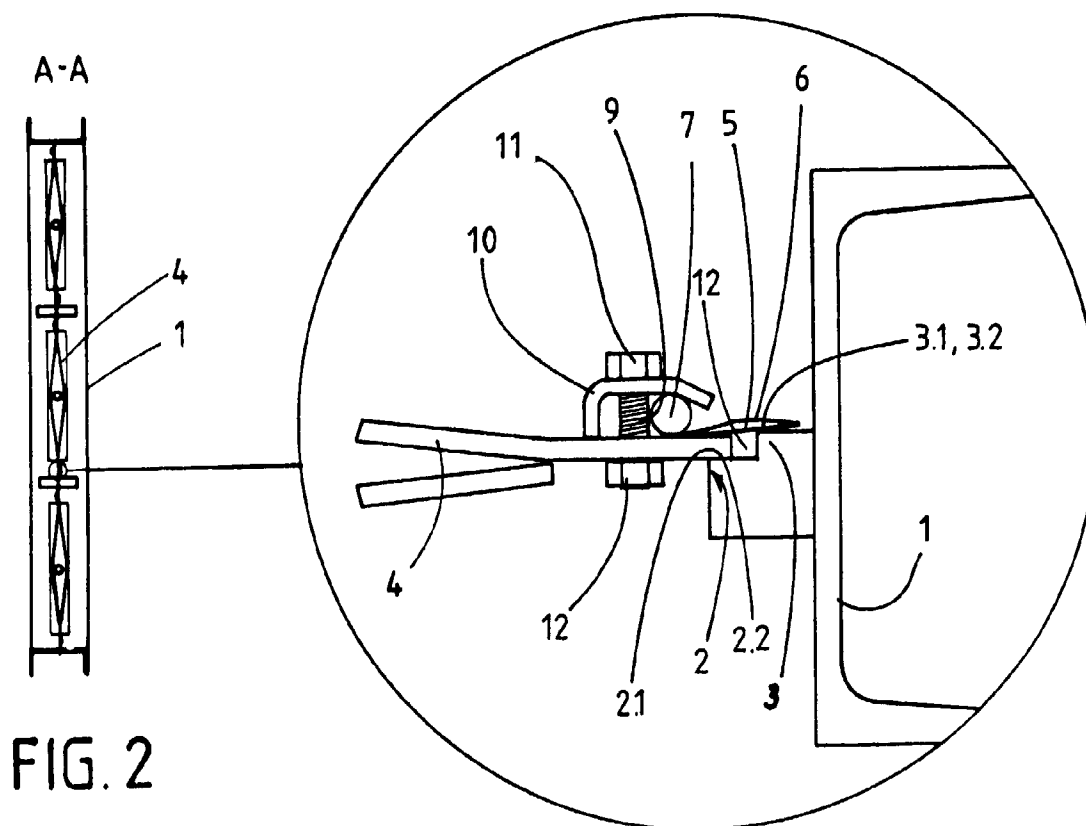


FIG. 2

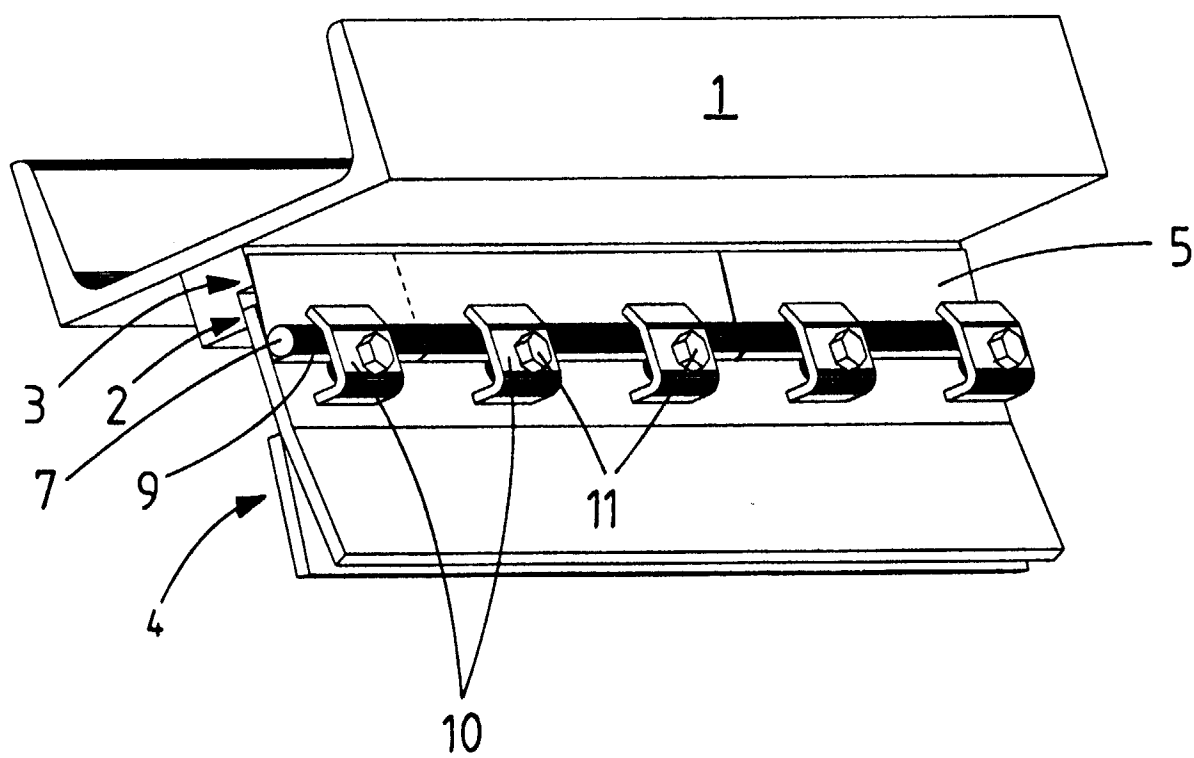


FIG. 3