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(54) **ARRANGEMENT FOR HINGING THE BLADE OF A FIRE DAMPER IN A TURNABLE MANNER TO THE FIRE DAMPER**

(57) Arrangement for hinging on an axle in a turnable manner the blade (2) of a fire damper to the fire damper, wherein the fire damper has a casing (1) inside which the blade (2) is hinged on an axle in a manner allowing it to be turned. The invention is implemented in such a way that two holes are made opposite each other in the

casing (1), and in that recesses (4) are made in the corresponding points in the edges of the blade (2), and in that two rivet nuts (5) functioning as axles are installed each from their own side through the hole of the casing into the recess (4) of the blade and riveted onto the casing (1).

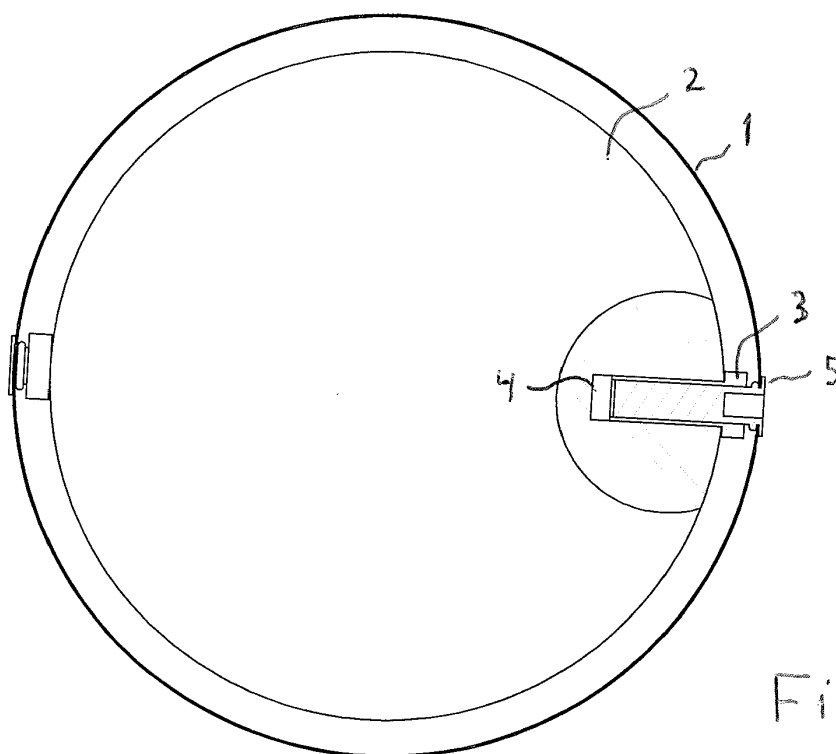


Fig. 4

Description

[0001] The object of this invention is an arrangement for hinging on an axle in a turnable manner the blade of a fire damper to the fire damper, wherein the fire damper has a casing inside which the blade is hinged on an axle in a manner allowing it to be turned.

[0002] In ventilation systems, different spaces are connected to each other. From the viewpoint of fire safety, the isolation of these spaces from each other in the event of a fire has become essential. After a fire has broken out, ventilation ducts function as efficient spreaders of combustion gases, fire and heat, for which reason it has become extremely important to develop automatically-operating shut-offs in ventilation ducts. Owing to this, modern ventilation systems are compartmentalized and e.g. so-called fire dampers are disposed between the compartments. A fire damper is open in a normal situation, i.e. air is able to move normally in the ducting. In the event of fire, the damper closes automatically, in which case the spreading of fire and combustion gases from one compartment to another is prevented or at least slowed down.

[0003] A fire damper is closed with a blade, which is hinged on an axle to the fire damper in a manner allowing turning. The hinging of blades is awkward because the fire safety characteristics of the product must be retained. The blade must be able to move around its axle without hindrance and the axle must be fixed to the casing in such a way that it also endures in the event of fire. Owing to the requirements for fire safety characteristics, the materials must be applicable for high temperatures. The axle must remain tightly in its position and the hinging must allow the blade to stay on the center line of the casing of the fire damper.

[0004] Numerous options for the fixing of axles exist; some axles are welded onto the casing, some are riveted, or the axles are pushed into the holes of the casing from the inside. Thus, there are many fastening methods, but often they are awkward and complex.

[0005] The purpose of the present invention is to achieve an arrangement for hinging a blade of a fire damper to the fire damper by means on an axle, which arrangement is characterized in that two holes are made opposite each other in the casing, and in that recesses are made in the corresponding points in the edges of the blade, and in that two rivet nuts functioning as axles are installed each from their own side through the hole of the casing into the recess of the blade and riveted onto the casing.

[0006] One preferred embodiment of the arrangement according to the invention is characterized in that before installation of the rivet nut, a bearing retainer is installed in the recess of the blade.

[0007] The method according to the invention for hinging a blade to the casing enables easy and rapid fixing of the axle. The fastening is also sturdy.

[0008] In the following, the invention will be described

in more detail by the aid of some preferred embodiments with reference to the attached drawings, wherein

Fig. 1 presents a three-dimensional view of a fire damper during the installation of the axle of the blade.

Fig. 2 presents a three-dimensional view of the fire damper when the axle of the blade has been installed.

Fig. 3 presents a cross-sectional view of a fire damper during the installation of the axle of the blade.

Fig. 4 presents a cross-sectional view of the fire damper when the axle of the blade has been installed.

Fig. 5 presents a magnified sectional view of the axle of the blade when installed into position.

[0009] The drawings thus present a very simplified view of a fire damper for ventilation. Only the casing 1 (duct part) of the fire damper and the turnably hinged blade 2, with which the flow in the duct can be closed in the event of a fire, are presented. The tripping mechanism of the blade, among other things, is also missing from the drawings. Likewise, normally surrounding the blade is a seal that seals the space between the blade and the casing when the blade closes.

[0010] The blade 2 is hinged to the casing 1 on an axle in such a way that two holes are made opposite each other in the casing 1. The holes are thus in the same point but on opposite sides of the casing. The theoretical axis via these holes travels via the center line of the duct, so the blade can successfully be installed symmetrically. Recesses 4 are made in the blade 2 at the point of the holes, into each of which holes a bearing retainer 3 is installed. As can be seen in Figs. 3 and 4, rivet nuts 5 are pushed into the bearing retainers 3 from outside the casing 1 of the fire damper. The rivet nut must be sufficiently long for the blade to remain firmly supported by it. The rivet nuts currently on the market are normally too short, so rivet nuts of special length must be manufactured for the purpose. The advantage of a rivet nut is that it enables single-sided riveting, i.e. a counterpart is not needed.

[0011] The rivet nut 5 is pushed, while placed into the rivet nut tool, through the hole of the casing 1 of the fire damper into the bearing housing (e.g. into the bearing retainer 3) of the blade 2 and riveted onto the casing. The same procedure is performed, of course, on both sides, in which case the blade 2 is hinged firmly into its position. Rivet nuts are *per se* known in the art and the fastening of them with a rivet nut tool is also a technique known in the art and is not therefore described in more detail here.

[0012] The rivet nut tool pulls a small bulge 6 into the rivet nut 5 behind the casing 1, as is seen best in Fig. 5.

In this way the rivet nut remains firmly in position.

[0013] It is obvious to the person skilled in the art that the invention is not limited to the embodiments described above, but that it can be varied within the scope of the claims presented below. The patent drawings present a bearing retainer 3 installed in the recess 4 made in the blade 2, but the invention can also function without a bearing retainer or the bearing can be realized in some other way. The preceding also presents two recesses 4 of a certain depth being made in the blade. In principle, this would also be possible to realize with one hole extending through the blade 2.

[0014] The characteristic features possibly presented in the description in conjunction with other characteristic features can also, if necessary, be used separately to each other.

Claims

1. Arrangement for hinging on an axle in a turnable manner the blade (2) of a fire damper to the fire damper, wherein the fire damper has a casing (1) inside which the blade (2) is hinged on an axle in a manner allowing it to be turned, **characterized in that** two holes are made opposite each other in the casing (1), and **in that** recesses (4) are made in the corresponding points in the edges of the blade (2), and **in that** two rivet nuts (5) functioning as axles are installed each from their own side through the hole of the casing into the recess (4) of the blade and riveted onto the casing (1).
2. Arrangement according to claim 1, **characterized in that** before installation of the rivet nut (5), a bearing retainer (3) is installed in the recess (4) of the blade (2).

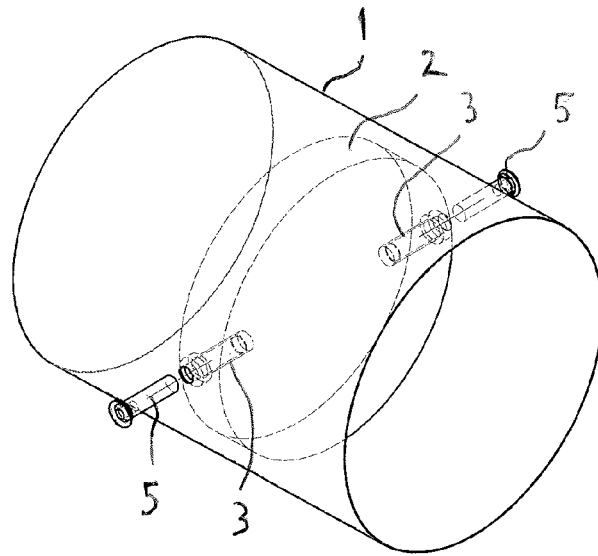


Fig. 1

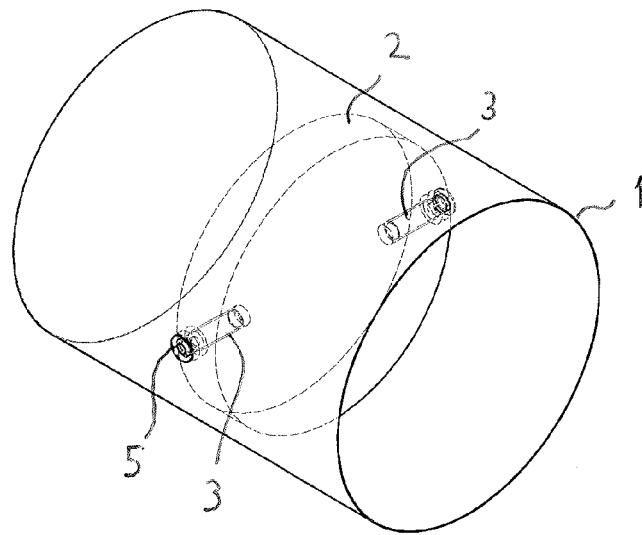


Fig. 2

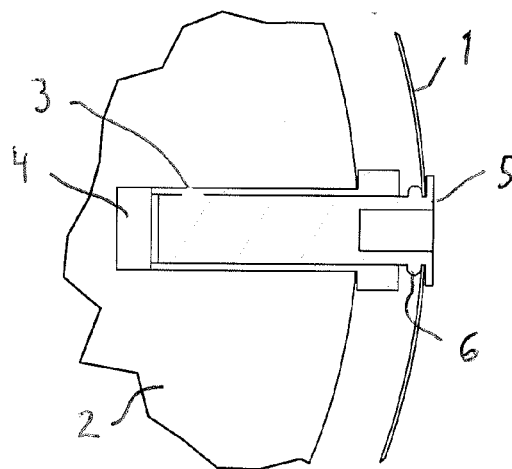
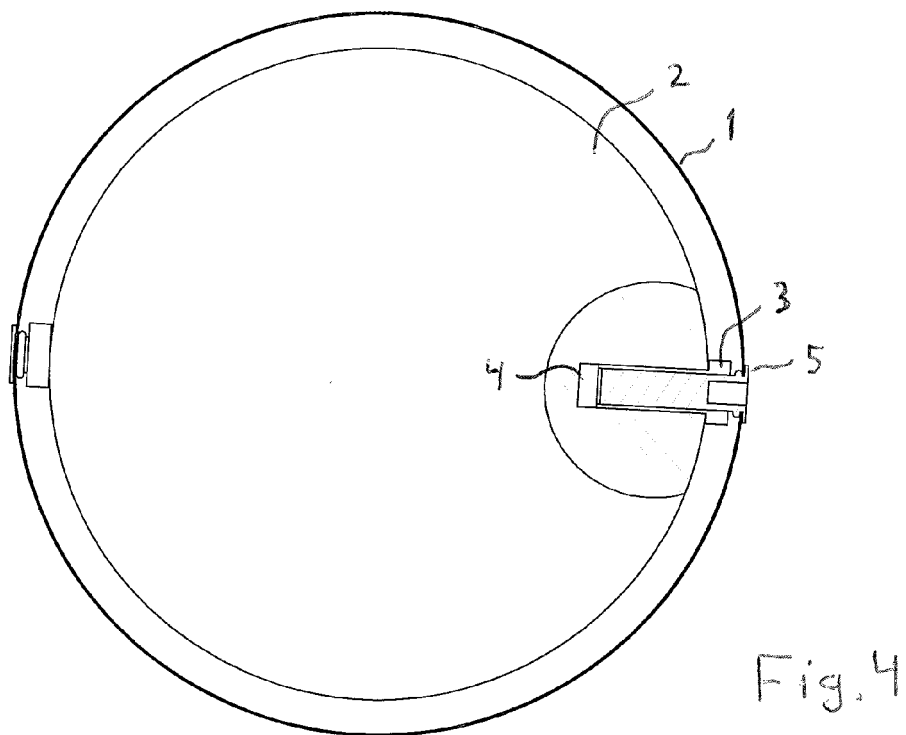
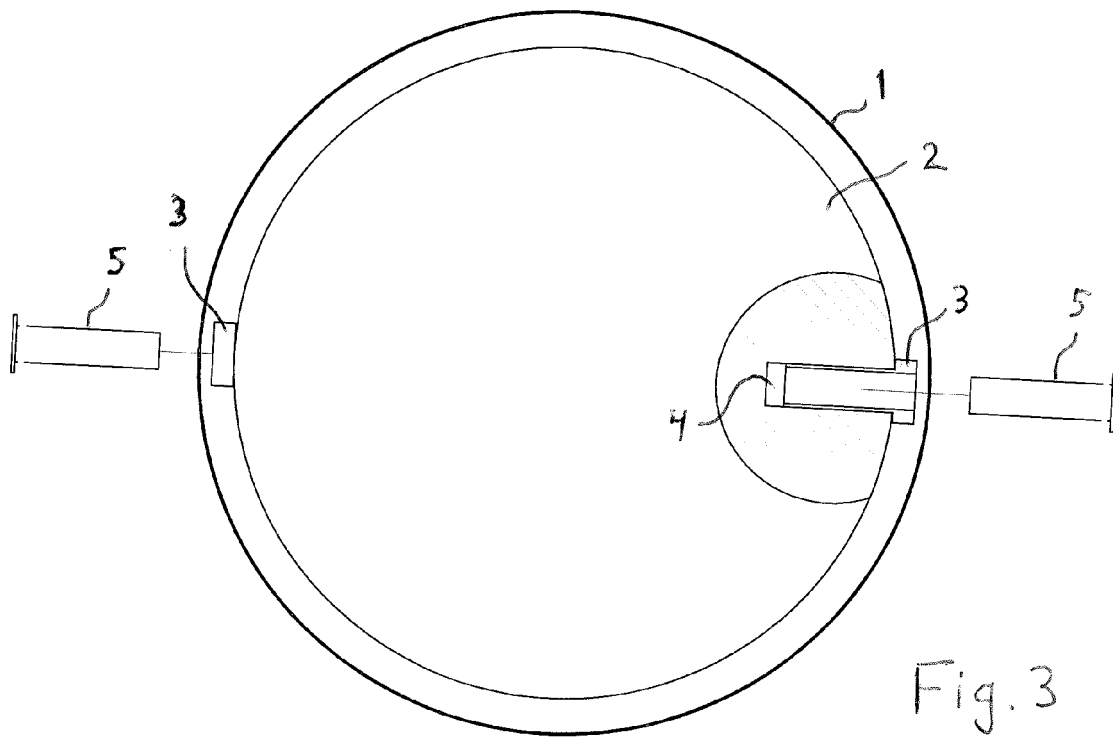


Fig. 5





EUROPEAN SEARCH REPORT

Application Number
EP 15 16 4439

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	EP 2 181 733 A1 (MP3 S R L [IT]) 5 May 2010 (2010-05-05) * paragraph [0001] * * paragraphs [0047] - [0073] * * paragraphs [0083] - [0090] * * figures 1-6 *	1,2	INV. A62C2/12
A	GB 120 607 A (BRODIE JOHN LEOPOLD [GB]) 11 November 1918 (1918-11-11) * page 1, lines 17-21 * * page 2, lines 37-41 * * figures 1, 2 *	1,2	
			TECHNICAL FIELDS SEARCHED (IPC)
			A62C
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 25 September 2015	Examiner Zupancic, Gregor
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 15 16 4439

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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25-09-2015

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EP 2181733	A1	05-05-2010	NONE

GB 120607	A	11-11-1918	NONE

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82