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### (54) FUSIBLE LINK TRIGGER MECHANISM OF THE CIRCULAR FIRE DAMPER

(57) The object of the invention is a fusible link trigger mechanism in a circular fire damper having a base, a mechanism cover and a fusible link trigger, characterised in that on the base, to which the cover is fixed on one side, on the base, to which the cover is attached on one side, a

lever and a catch are movably mounted by means of pins, with a spring between the lever and the catch, the tension of which is maintained by the thermal release, while the catch is connected to the linkage and to a test linkage passing through a hole to the other side of the cover.

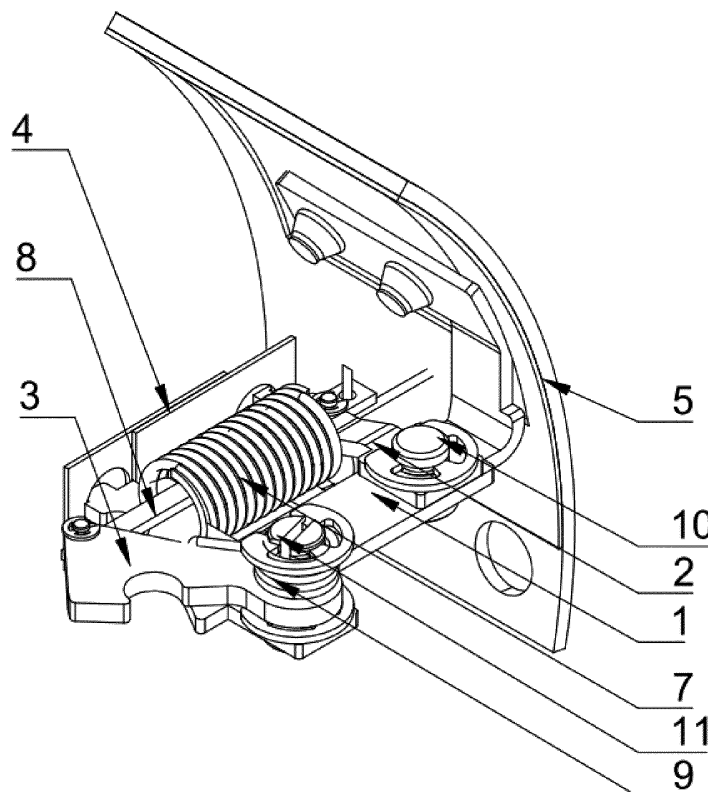


Fig. 1

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## Description

**[0001]** The object of the invention is a fusible link trigger mechanism for a circular fire damper.

**[0002]** One of the elementary requirements, that the fusible link trigger mechanism must provide in addition to ensuring effective operation of the mechanism in the event of a fire, i.e. in a situation where a fusible (or thermal) trigger is activated as a result of a temperature rise in the event of a fire, is the ability to carry out a test of the correct closing of the fire dampers and its re-opening without activating (permanent damage as a result of high temperatures) the trigger. Although regulators - the creators of regulations in individual countries may allow solutions without the above-mentioned option, or, for example, may not specify a formal requirement to carry out periodic tests of fire dampers' operation, even from the point of view of a rational user, periodic checking of the correct operation of the fusible (thermal) trigger mechanism and verification of correct closing of the damper is an important requirement, which will enable correct operation of fire dampers for many years. Such capabilities are provided by the fusible link trigger mechanism which is the subject of the invention.

**[0003]** NAILOR's well-known Easy Maintenance Link (EML) solution shown in Nailor Catalog - Curtain Fire Damper Static Garbage Chute 0130GC on page D68 provides a simple solution to the inconvenience of performing manual testing of curtain-type fire dampers. NFPA 80, Standard for Fire Doors and Other Opening Protection, requires periodic inspection and testing of fire dampers 1 year after installation and every 4 years thereafter, except in hospitals where the frequency is every 6 years. NAILOR's EML allows a 4 1/4 "(108) deep rectangular fire damper to be quickly and easily released, tested and reopened with one hand, even through the smallest inspection opening which nevertheless allows hand access around the EML mechanism. This saves time and money, ensuring the protection of building occupants. The EML is accessible from either side of the flap. The EML must be installed at the factory and cannot be added in the field to fire damper installations.

**[0004]** Another well-known solution is the fusible link trigger mechanism used in TROX FKRS-EU circular fire dampers called handling and replacing fusible link holder. However, its installation requires special moulding - stamping a base in the damper body for mounting. In addition, a significant part of the handling and replacing fusible link holder mechanism protrudes above the fire damper body and its removal requires a screwdriver. The above limitations make it necessary to provide service access that provides a clear view of the mechanical installation location and service access to allow insertion and operation of the screwdriver.

**[0005]** The aim of the invention was to provide such a mechanism for the thermal release of a circular fire damper, which makes it possible to test the closing and re-opening of fire dampers installed in the fire pro-

tection system, does not occupy space outside the damper and, to replace the thermal element, e.g. the fuse, does not require service tools such as a screwdriver or a spanner, so that it is not necessary to plan the location of the damper installation, so that there is additional service space to operate the above-mentioned tools and visibility of the mechanism to allow the service technician to carry out the replacement. Ideally, the new technical solution should ensure that it is possible to carry out a function test of the fire damper and to replace the fuse element if it is possible for the service technician's hand to enter the trigger and the mechanism despite limited visibility, and that the actions required for the above-mentioned activities, in the extreme case, are so intuitive that they do not require visual contact with the trigger and the fire damper.

**[0006]** The essence of the invention is a fusible link trigger mechanism in a circular fire damper having a base, a mechanism cover and a fusible link trigger characterised in that on the base, to which the cover is fixed on one side, on the base, to which the cover is attached on one side, a lever and a catch are movably mounted by means of pins, with a spring between the lever and the catch, the tension of which is maintained by the fusible link trigger, while the catch is connected to the linkage and to a test linkage passing through a hole to the other side of the cover.

**[0007]** Advantageously, the pin fixing the catch is placed on the spring.

**[0008]** Advantageously, a gasket is placed along each edge of the cover.

**[0009]** Advantageously, the fusible link trigger is a thermal and consists of two plates connected by a bonding agent which melts as a result of the raised temperature.

**[0010]** Advantageously, there are holes in the cover for guide pins and a catch for the fastener. Advantageously, the fusible link trigger mechanism is mounted in the body opening of a circular fire damper, with a fastener and guide pins on the body.

**[0011]** The object of the invention is a fusible link trigger mechanism in a circular fire damper with an integrated function enabling a test of the fire damper closing and opening.

**[0012]** The object of the invention is a fusible link trigger mechanism in a circular fire dampers as shown in the example and drawings, where fig. 1 shows a fusible link trigger mechanism in a circular fire dampers in side view, fig. 2 shows the fusible link trigger mechanism in a circular section fire damper in the rear view, from the side of cover 5 with gasket; fig. 3 shows the fusible link trigger mechanism in a circular section fire damper fixed in the damper with the blade in the open position; fig. 4 shows the fusible link trigger mechanism in a circular fire damper fixed in the damper with the blade in the closed position; Fig. 5 shows the removal of the fusible link trigger mechanism in a circular fire damper.

**[0013]** Applied to the invention, it provides the following benefits:

- quick replacement of the fusible link trigger without the use of tools,
- quick replacement of the fusible link trigger mechanism in the flap without the use of tools,
- carry out a test of the correct closure and opening of the flap to verify the correct operation of the fire damper blade closing mechanism.

**[0014]** The fusible link trigger mechanism of the circular fire damper has a base 1, to one side of which is fixed perpendicularly a cover 5 with a gasket and, through pins 10 and 11, movable elements in the form of a lever 2 responsible for releasing the catch 3 in the event of tripping of the fusible link trigger 4 when exposed to high temperature and the catch 3. The lever 2 and the catch 3 are driven - they move, thanks to the energy accumulated in the springs 7 mounted along base 1 and the spring 9, which is located on the pin 11. The tension of the spring 7 is maintained by the fusible link trigger 4 preferably a fusible link mounted along the spring 7. In addition, linkage 8 and test linkage 6 are connected to catch 3, passing through an opening to the other side of cover 5 with a gasket, enabling a test to be carried out to close the flap. The opening in cover 5 through which the test linkage 6 passes can be sealed with a grommet seal.

**[0015]** The fusible link trigger mechanism in a circular fire damper according to the invention operates as follows: the fire damper blade 12, to which the handle 13 is attached, when opened, is immobilised in the open position due to the latching of the handle 13 by the catch 3, which is part of the mechanism according to the invention. Closing of the blade 12 is possible in two cases:

a) in the event of fire, a fusible link trigger 4, which is a thermal release consisting of two plates joined by a fuse which melts as a result of the increased temperature, causing them to disengage, with the result that the catch 3 is pulled back by spring 7, so that the blade 12 with the handle 13 attached to it is released and the spring attached to it causes it to close,

b) in order to test the correct functioning of the fire damper closing mechanism - after pulling the test linkage 6, the catch 3 is pulled back and the blade 12 is released, which closes due to the spring action.

**[0016]** In another example of implementation, the closing of blade 12, to which the handle 13 is attached, is opened by rotation of an external lever connected by a linkage system to the blade 12.

**[0017]** The method of dismantle the assembly to replace the fuse trigger is shown in fig. 5.

**[0018]** Replacement of the fusible link trigger 4 is possible when the fire damper is in the closed position. It is then necessary to release the latch 15 and slide the mechanism assembly 18 out of the guide pins 17. You then have free access to the fusible link trigger 4. To reassemble, slide the mechanism assembly 18 onto the

guide pins 17 and fasten the assembly to the flap body using the latch 15 and the catch 16 fitted to the cover 5 with the seal of the mechanism assembly 18.

## Claims

1. A fusible link trigger mechanism for circular fire dampers with a base, mechanism cover and fusible link triggering device, **characterised in that** on the base (1), to which the cover (5) is attached on one side, a lever (2) and a catch (3) are movably mounted by means of pins (10 and 11), whereby between the lever (2) and the catch (3) there is a spring (7) whose tension is maintained by a fusible link trigger (4), while the catch (3) is connected to a linkage (8) and to a test linkage (6) passing through a hole to the other side of the cover (5).
2. The mechanism according to claim 1, **characterised in that** the pin (11) fixing the catch (3) is placed on the spring (9).
3. The mechanism according to claim 1, **characterised in that** a gasket is placed along each edge of the cover (5).
4. The mechanism according to claim 1, **characterised in that** the fusible link trigger (4) is a fusible trigger and consists of two plates connected by a bonding agent which melts as a result of the raised temperature.
5. The mechanism according to claim 1, **characterised in that** the cover (5) has holes for guide pins (17) and a catch (16) for a latch (15).
6. The mechanism according to any of the above claims **characterised in that** it is mounted in the body opening (14) of a circular fire shut-off damper, the body 14 having a latch (15) and guide pins (17).

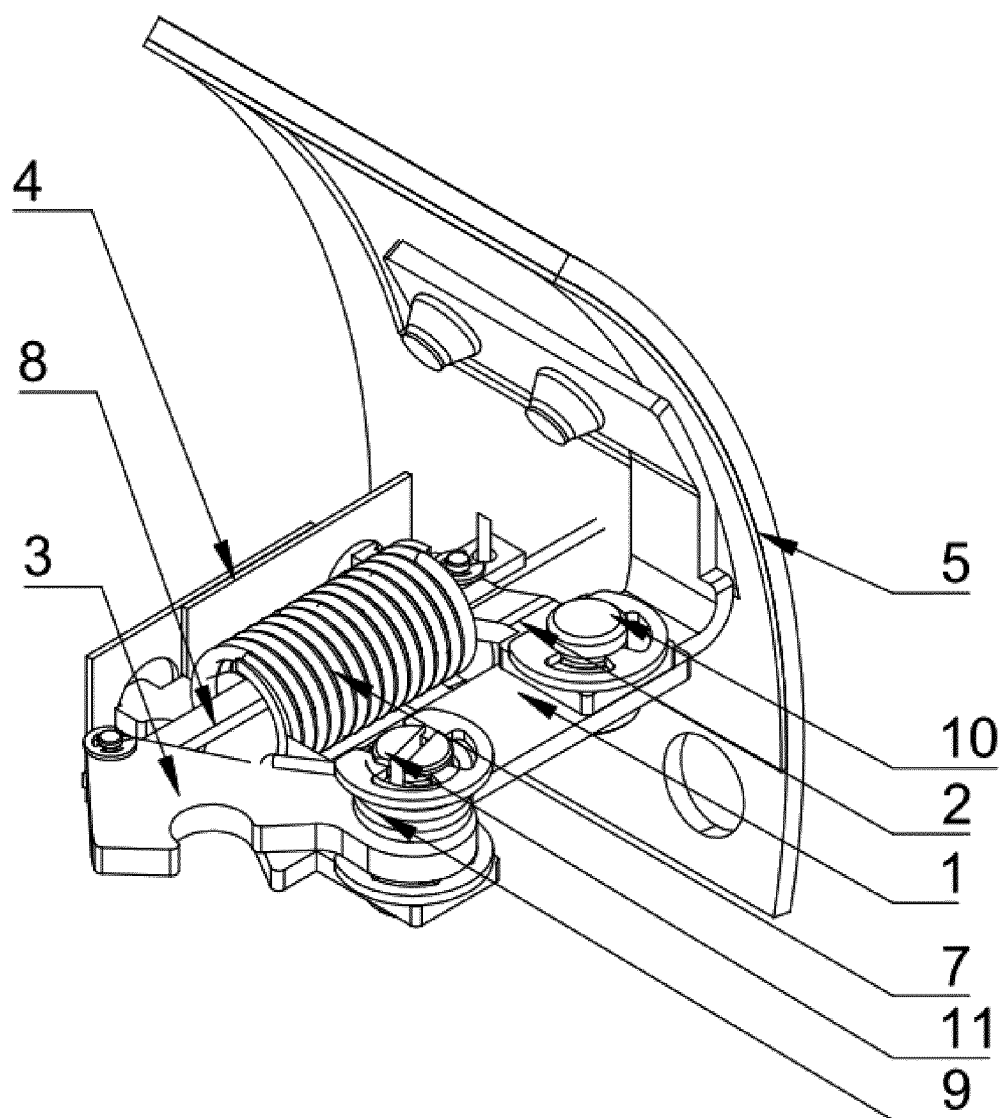


Fig. 1

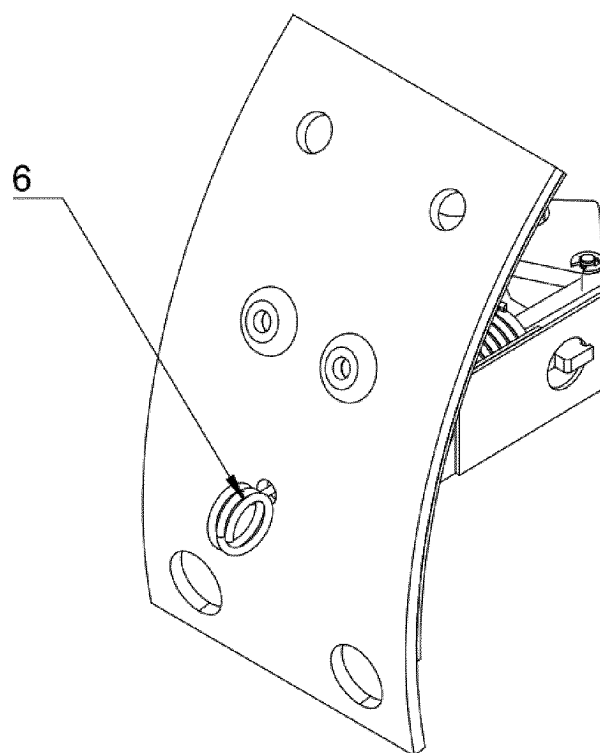


Fig. 2

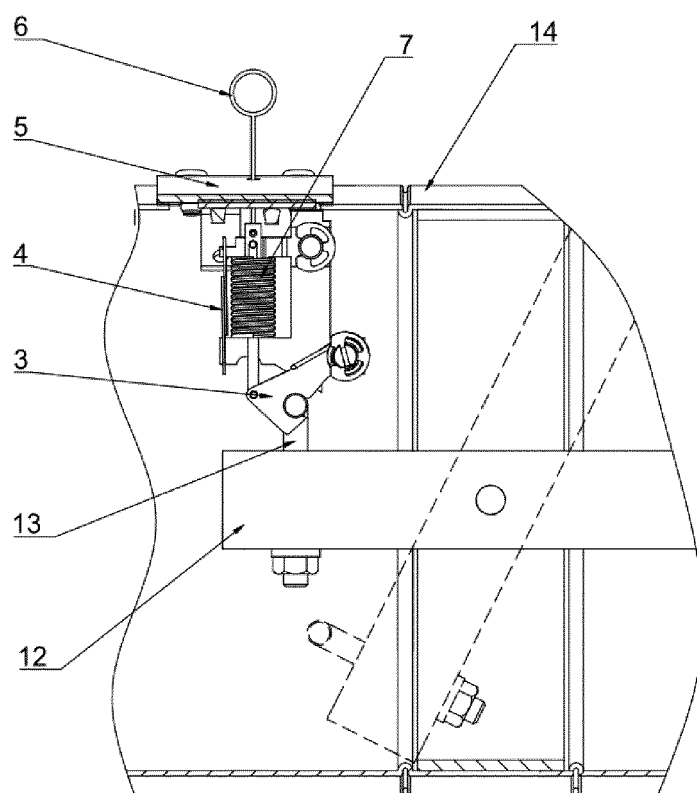


Fig. 3

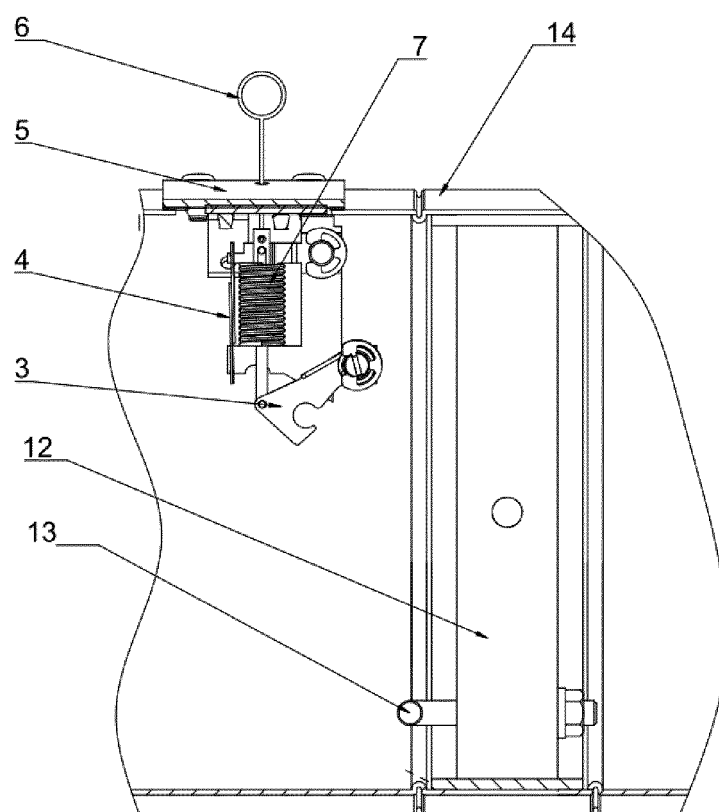


Fig. 4

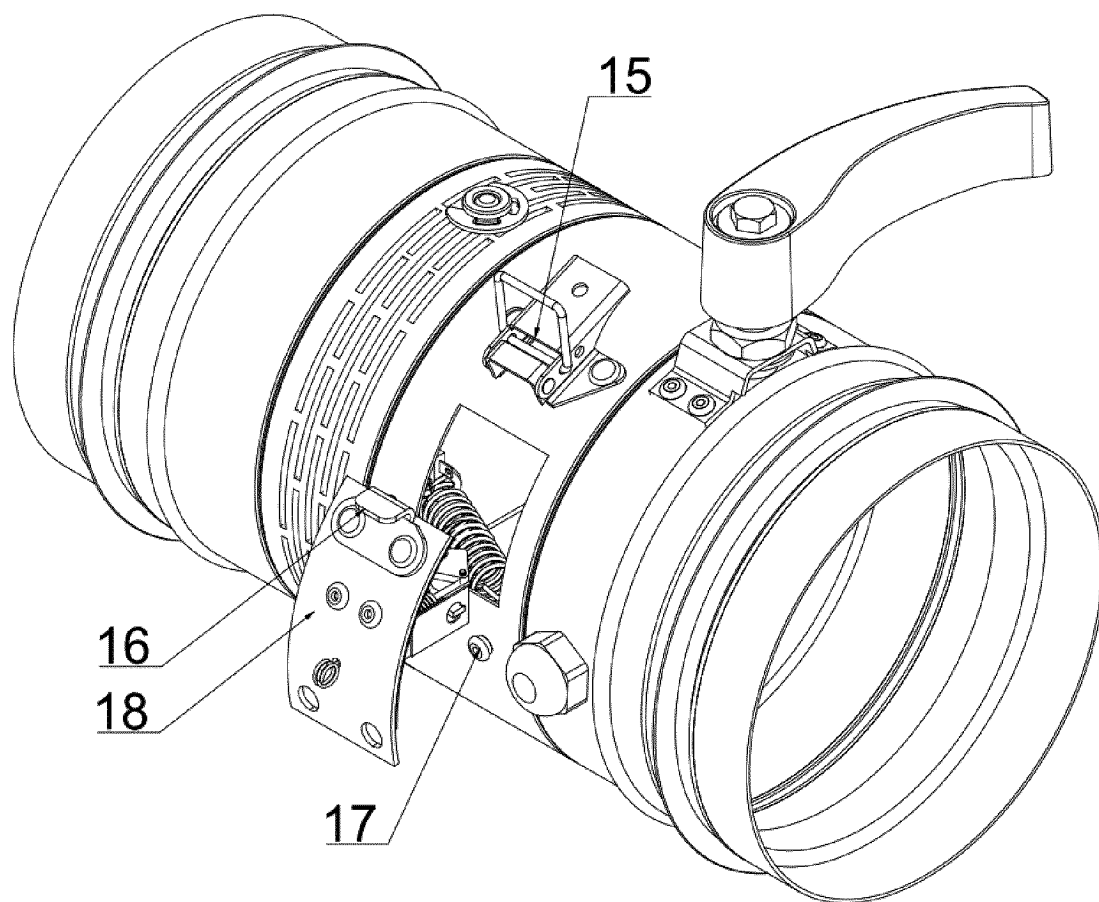


Fig. 5





## EUROPEAN SEARCH REPORT

Application Number

EP 23 20 9078

## 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 3 834 892 A1 (TROX GMBH GEB [DE]) 16 June 2021 (2021-06-16) * paragraph [0069]; figures * -----	1-6	INV. A62C2/12 A62C2/24
A	US 8 281 471 B2 (FLORIAN MICHAEL J [US]; AIRE TECHNOLOGIES INC [US]) 9 October 2012 (2012-10-09) * column 1, line 17 - line 50; figures * -----	1-6	
A	GB 2 613 582 A (H V C SUPPLIES STOURBRIDGE LTD [GB]) 14 June 2023 (2023-06-14) * page 4, line 2 - line 4; figures * -----	1-6	
			TECHNICAL FIELDS SEARCHED (IPC)
			A62C
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		19 April 2024	Vervenne, Koen
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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			
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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 3834892	A1	16-06-2021	NONE
US 8281471	B2	09-10-2012	NONE
GB 2613582	A	14-06-2023	NONE

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