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(54) Device for the preferably pneumatic automatic actuation of ventilation flaps in particular.

(57) The device (1) has a locking unit (4) which holds one or more piercing pistons (3) of an energy-carrying unit (6) in their locked position. The device comprises a thermofuse arrangement (8, 9, 8) which breaks when a critical temperature is exceeded, and which is supported, at one end, on a longitudinally movable locking rod member (5) which is in operational communication with the piercing piston (3). The individual fuse elements (8, 9) optimize the operational reliability of the device. The fuse elements are arranged in parallel rather than in series in a further embodiment.

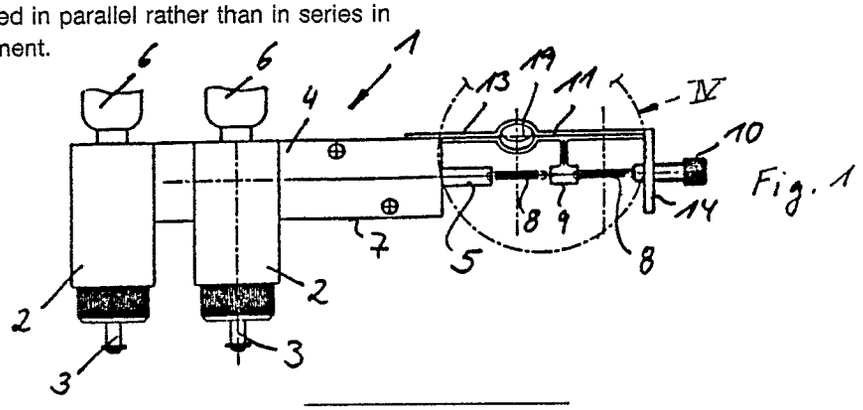

Fig. 1

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DEVICE FOR THE PREFERABLY PNEUMATIC AUTOMATIC ACTUATION OF VENTILATION FLAPS IN PARTICULAR

The invention relates to a device for the preferably pneumatic automatic actuation particularly of ventilation flaps, ventilation louvres and the like in smoke and heat offtake installations, in a construction according to the preamble to claim 1.

A device of this kind is known from DE-OS 36 05 560. In this device, the fuse which can be supported on the locking rod member is constructed in the form of a thermal glass fuse element which is filled with a liquid causing the glass fuse to burst when a specific temperature is exceeded so that, in case of fire, after bursting of the thermal glass fuse element, the piercing piston can be unlocked through the locking rod member and the energy-carrying unit, which is generally constructed in the form of a compressed-air cartridge, can be pierced and thus released for the automatic actuation. Such devices for automatic actuation are generally provided in buildings to react exclusively in case of fire and hence in case of a disaster so that their operativeness only has to be checked by testing and maintenance measures to be carried out at specific intervals of time. Despite such measures, it can nevertheless happen, in conventional devices, that individual devices do not respond in the event of a disaster and so the automatic actuation of the ventilation flaps and hence the desired automatic ventilation of rooms is not ensured.

It is the object of the present invention to provide, with structurally simple means, a device of the kind mentioned at the beginning which offers an increased amount of reliability with regard to the response behaviour in a case of disaster, in comparison with conventional devices.

In order to solve this problem, the device of the kind mentioned at the beginning is distinguished by the features given in the characterising part of claim 1. With regard to further important advantageous developments, reference should be made to claims 2 to 8.

As a result of the individual fuse elements arranged in series or in parallel and together forming the fuse of the device, the operational reliability of the device with regard to its response behaviour in a case of disaster can be increased by a decisive amount with only small structural expense. With conventional thermal glass fuse elements, there is actually the not inconsiderable risk that the capillary tube usually provided may be damaged, for example during removal from a storage container or insertion in the device, either during the first assembly or, for example, in the course of testing or maintenance work, with the consequence that leaks occur and the liquid with which it is filled runs out so that devices of conventional construction, because of this damage and despite their otherwise by no means small structural expense, are no longer in a position to ensure an automatic actuation of ventilation flaps in the event of a disaster, in contrast to the device according to the invention.

Some ways of carrying out the present invention will now be described in detail by way of example with reference to drawings which illustrate two specific embodiments of the present invention. In the drawings:

FIG. 1 shows, in a side view, a first embodiment of the invention with two individual fuse elements arranged in series and an L-shaped clamp;

FIG. 2 shows a front view of the embodiment according to Figure 1;

FIG. 3 shows a plan view of the embodiment according to Figure 1;

FIG. 4 shows, enlarged, the region of the embodiment of Figure 1 which is identified by IV in Figure 1;

FIG. 5 shows, in a side view, an alternative embodiment of the device with individual fuse elements arranged in parallel and a U-shaped clamp;

FIG. 6 shows a front view of the embodiment according to Figure 5;

FIG. 7 shows a plan view of the embodiment according to Figure 6;

FIG. 8 shows, enlarged, the region of the embodiment of Figure 5 which is identified by VIII in Figure 5; and

FIGS. 9 and 10 show alternative possible arrangements of individual fuse elements arranged in parallel, in partial plan view in the embodiment shown in Figure 5.

With reference to the drawings, the device numbered in general by 1, for the automatic actuation of ventilation flaps, for example, has a piercing piston unit 2 with piercing pistons 3 which have to be kept in a safety position through a locking unit numbered in general by 4 and having a locking rod member 5. Through the piercing pistons 3, compressed-air cartridges 6, illustrated diagrammatically in the drawings, have to be pierced in case of fire and be caused to discharge. Supported on the end of the locking rod member 5 projecting out of the housing 7 of the locking unit is the bottom or rounded end of a first individual fuse element of a total of three individual fuse elements 8, 9 arranged in series and forming the fuse. The two individual fuse elements 8 connected in series are formed by conventional thermal glass fuse ele-

ments which in turn are supported, by their ends adjacent to one another, on a holder 9 again forming an individual fuse element. The holder 9 forming an individual fuse element connected in series is part of a supporting member which supports the fuse at the opposite end from the locking rod member 5 and which, in the example of embodiment shown in Figure 1, is supported by an L-shaped clamp 11 through a screw element 10. If one of the thermal glass fuse elements 8 is damaged, for example in the region of the capillary tube, assurance is nevertheless provided, in the event of a disaster, that the piercing pistons 3 can still be unlocked by bursting of the holder 9 or of another individual glass fuse element which has not been destroyed.

In the embodiment shown in Figure 5, the fuse is formed by two or three (Figure 10) individual fuse elements 8 which are arranged in parallel and which, in the embodiment illustrated, are each formed by conventional thermal glass fuse elements filled with thermo-liquid. The fuse elements arranged in parallel are supported, at their ends adjacent to the locking rod member 5, on an intermediate member 20 which in turn is supported on a spherical or hemispherical end of the locking rod member 5. In the embodiment illustrated, this intermediate member 20 is constructed in the form of a plate and comprises substantially hemispherical receiving spaces for the hemispherical ends of the individual fuse elements 8.

As a result of this method of support, assurance is provided that, even if only one of the individual fuse elements 8 arranged in parallel responds, the unlocking of the piercing pistons can be brought about through the locking rod member 5. In this embodiment, the individual fuse elements 8 are again supported, through screw elements 10, against a clamp 12 which here has a U-shaped formation, however. The arms 13 and 14 of the L-shaped clamp 11 or 15, 16, 17 of the U-shaped clamp 12 are formed by relatively narrow square sections. The clamps 11 and 12 of the embodiments illustrated each have a longitudinal central plane which is arranged inclined by about 45° to the vertical 18 so that the individual fuse elements 8, 9 can be blown against from below, and laterally and obliquely from above, and thus freely altogether so that even if the devices are disposed in a roof region, with the transverse flows prevailing there, an unhindered approach flow to the fuse elements of the devices is possible. In the longitudinal region of the arm 13 engaging over the first individual fuse element 8 of the embodiment shown in Figure 1 or in the longitudinal region of the arm 15 engaging over the upper individual fuse element of the embodiment shown in Figure 5, the respective arm is made circular with a flow space 19 so that the inflowing air can emerge unhindered through the flow space 19 and no damming up occurs.

As an additional fuse element, particularly for the case where each of the fuse elements may have suffered damage, it is additionally possible, particularly with the embodiment shown in Figure 5 with the L-shaped clamp 11, to provide a predetermined bending point in the region of a housing connection, which predetermined bending point renders possible bending away in case of fire solely as a result of the fact that, on rising pressure in the conventional CO_2 compressed-air cartridge as an energy-carrying unit, the rupture disc usually provided there ruptures at a specific pressure and thus exerts an increased loading, via the locking rod member 5, on the clamp 11.

Claims

1. A device (1) for the preferably pneumatic automatic actuation particularly of ventilation flaps, ventilation louvres and the like in smoke and heat offtake installations having a locking unit (4) which holds one or more piercing pistons (3) of an energy-carrying unit (6) in their locked position, which comprises a fuse responding depending on temperature, particularly a thermal fuse which breaks when a critical temperature is exceeded, which fuse can be supported, at one end, on a longitudinally movable locking rod member (5) which is in operational communication with the piercing piston (3), characterised in that the fuse is formed by at least two individual fuse elements (8, 9) which are arranged in series or in parallel.

2. A device according to claim 1, characterised in that individual fuse elements (8) which are disposed in series can be supported at their ends adjacent to one another on a holder which in turn is constructed in the form of an individual fuse element (9) and is part of a supporting member (11) holding the fuse at the end opposite to the locking rod member (5).

3. A device according to claim 2, charac terised in that the holder comprises a receiving space for the introduction of a thermo-liquid.

4. A device according to claim 1, characterised in that the individual fuse elements (8) arranged in parallel are held, at their ends adjacent to the locking rod member (5), on an intermediate member (20) which can be supported on the locking rod member (5).

5. A device according to claim 4, characterised in that the end of the locking rod member (5) supporting the intermediate member (20) comprises a ball or is constructed in spherical or hemispherical shape.

6. A device according to any one of the claims 1 to 5, characterised in that the individual fuse elements (8) can be supported via a supporting member constructed in the form of an L-shaped or U-shaped clamp (11; 12) at the end of the fuse situated opposite to the locking rod member (5).

7. A device according to claim 6, characterised in that the U-shaped or L-shaped clamp (11; 12) is held on the locking unit (4) with a longitudinal central plane inclined to the vertical (18).

8. A device according to claim 6 or 7, characterised in that the arms (13, 14; 15, 16, 17) of the U-shaped or L-shaped clamp (11, 12) are formed by narrow square sections.

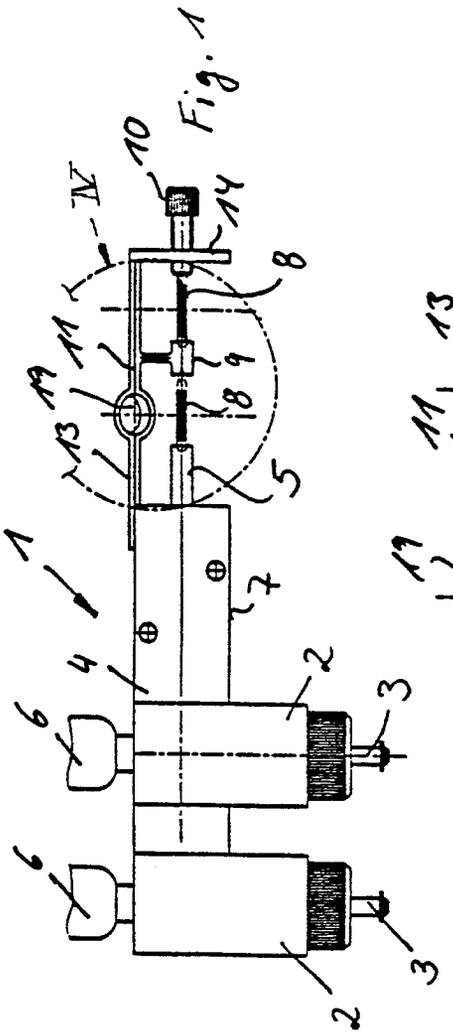
Fig. 1
IV
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11
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9
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2
3
6

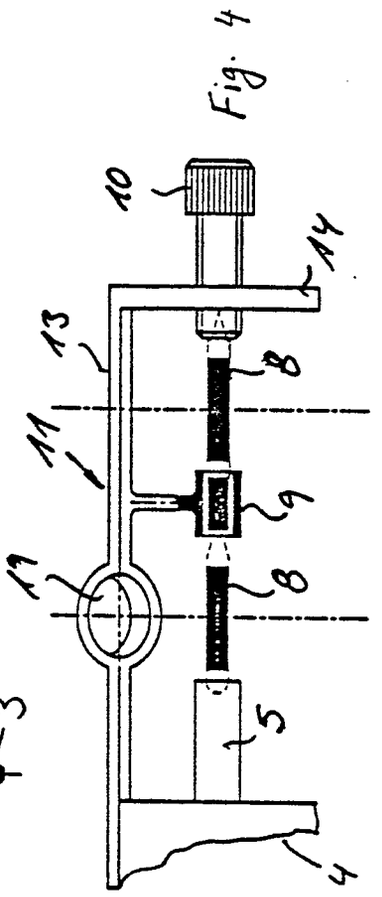
Fig. 4
10
14
13
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19
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4

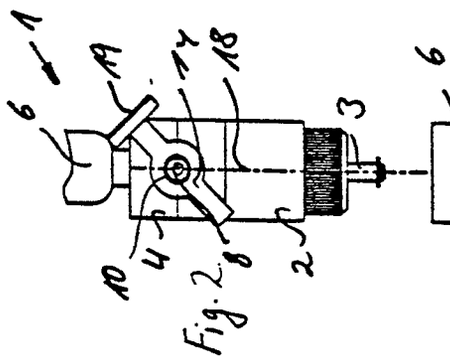
Fig. 2
1
6
19
17
18
3
10
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2

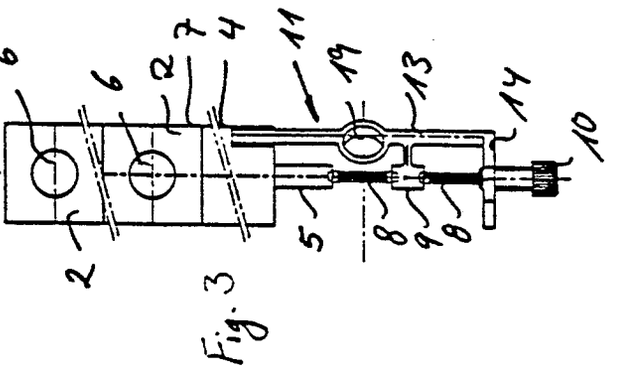
Fig. 3
6
6
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7
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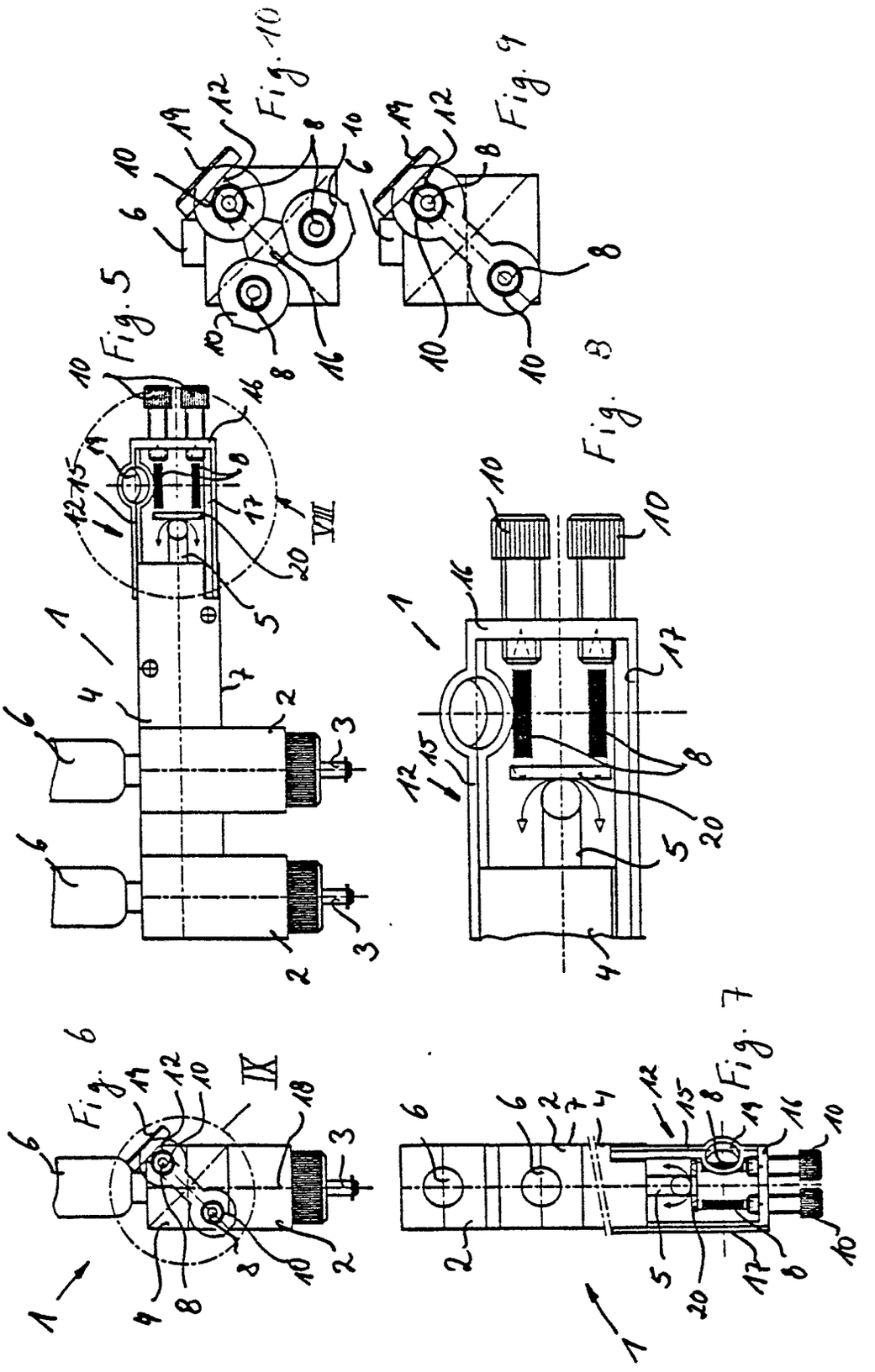
Fig. 10
Fig. 9
Fig. 5
Fig. 8
VIII
Fig. 6
IX
Fig. 7