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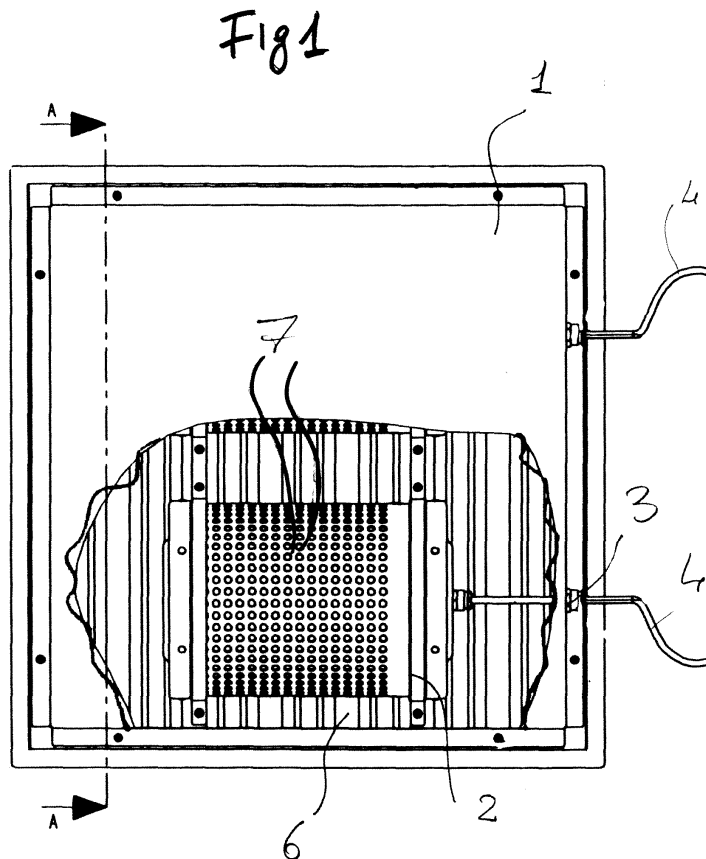
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(54) **Flush-mounted fire extinguisher assembly**

(57) Flush-mounted fire extinguisher assembly which comprises a box-shaped body suitable for being flush-mounted in walls, double walls, ceilings and false ceilings and the like, the side thereof which faces the room being closed by a covering panel consisting of a

labyrinth grille having a filter function, the box-shaped body containing internally at least one aerosol extinguishing device, heating of which is obtained by means of an activator or igniter which is located preferably inside the cylindrical package of solid substance convertible into aerosol.



Description

Field of the invention

[0001] The present invention relates to a flush-mounted fire extinguisher assembly.

[0002] In particular, the invention relates to an assembly for at least one flush-mounted fire extinguisher which is arranged in a fixed position on walls, double walls, ceilings or false ceilings and the like.

Prior art

[0003] Aerosol fire extinguishers according to the present invention are understood as meaning fire extinguishers of the type which use a solid substance, preferably based on potassium salts or similar mixtures which are activated by means of ignition, thus generating the extinguishing mixture. By way of example, the solid substance may be formed by potassium nitrate in amount equivalent to 90% and its aerosol conversion temperature is in the region of 150°C. Moreover, the nitrate formed exothermally is completely anhydrous and may therefore be used to extinguish a fire when it breaks out, even in the presence of electrical equipment, without the risk of conduction caused by electrolytic phenomena associated with the potassium salt.

[0004] These types of fire extinguishers have a hollow body which comprises internally, communicating with the outside via openings, a chamber for receiving a solid substance which, activated by means of an igniter, also called an activator, provided inside the solid substance itself, is converted, at a given temperature, into an aerosol having flame-extinguishing properties and is discharged as an aerosol through the openings in said hollow body.

[0005] Preferably the solid substance is completely surrounded by inert material, such as stones, alumina beads or ceramic materials. The function of the inert material is to absorb the heat generated at the time of ignition or activation of the solid substance.

[0006] Once activated, the solid substance is converted into an aerosol formed mainly by carbonates which enter into the flame generating chain, extinguishing it, and by other products arising from conversion of the solid substance which produces the aerosol and expelled together with the aerosol. These products may be carbonaceous, sticky, oily and clingy residues in the form of large-size particles which by their nature not only do not help extinguish the flame, but on the contrary impede the extinguishing effect, since they are incandescent and, being conveyed along by the cloud of gas and aerosol, could come into contact with persons present within the radius of action of the device, burning them.

[0007] Fire extinguishers of this type are usually positioned externally on walls, ceilings or the like, resulting in disadvantages from the point of view of aesthetics and space occupied as well as maintenance difficulties, in particular when mounted in restricted and/or small-size

spaces.

[0008] Therefore, the main object of the present invention is to improve both the flame-extinguishing capacity and the level of safety during use of a flush-mounted aerosol fire extinguishing device, with regard to the danger posed by incandescent particles emitted from it.

[0009] According to the present invention, an assembly for a flush-mounted aerosol fire-extinguishing device which overcomes the abovementioned drawbacks is provided, said assembly comprising a box-shaped body, which preferably has a substantially parallelepiped form and is able to be flush-mounted and positioned in a fixed location in walls, double walls, ceilings and false ceilings and the like, the side thereof which faces the room being closed by means of a panel formed substantially by a so-called labyrinth grille which performs a further filter function.

[0010] The box-shaped body, which is kept in position by a shaped seat, in a manner known per se, fixed to the box-shaped body, contains at least one aerosol fire extinguisher consisting preferably of a cylindrical body with holes on its outer surface of the conventional type and containing a cylindrical package of solid substance, heating of which is performed by means of an activator in the form, for example, of an igniter which is preferably situated inside the cylindrical package of solid substance convertible into aerosol.

[0011] The present invention will now be described with reference to a preferred embodiment thereof, although it is understood that constructional variations are possible without thereby departing from the scope of protection of the present invention and with reference to the figures of the accompanying drawings in which:

Figure 1 shows a top plan view, partly cut away, of the flush-mounted fire extinguisher assembly according to the present invention;

Figure 2 shows a cross-section along the line A-A of Figure 1;

Figure 3 shows a perspective top plan view of the casing of the flush-mounted fire extinguisher assembly;

Figures 4 and 4a show a perspective and partly sectioned view of the flush-mounted fire extinguisher assembly and an example of a labyrinth profile; and

Figure 5 shows a schematic view of the flush-mounted fire extinguisher assembly in combination with a preferred embodiment of the associated connections to replaceable igniters.

[0012] With reference to the drawings, Figure 1 shows a top plan view, partly cut away, of the flush-mounted fire extinguisher assembly, comprising a box-shaped element 1 housing internally at least one aerosol extinguish-

er 2 formed by a hollow body with a preferably cylindrical shape and comprising at least one cable guide 3 with connector 4 emerging from the box-shaped body 1.

[0013] With reference to Figure 2 the box-shaped body 1 has at least one semi-cylindrical seat integral with the end grille 6 of the box-shaped body 1 for holding at least one extinguishing device 2.

[0014] Figures 3 and 4 show a perspective bottom and side view, respectively, of the box-shaped body 1. Said box-shaped body 1 is fastened to a labyrinth grille 6 by means of the flange 6a.

[0015] With reference to Figure 4, this shows the layout of the end grille 6 of the labyrinth type, suitable for retaining carbonaceous, sticky, oily and clingy residues in the form of large-size particles.

[0016] Figure 4a shows a partial cross-section of an example of the form of a grille 6 of the labyrinth type with filter functions, consisting of a flanged frame 6a which supports a filtering partition formed by shaped blades 60, 61 which, in a preferred embodiment, are curved and made of the same material as the frame. This characteristic form forces the outflowing air to change direction suddenly such that the solid particles, owing to the inertia resulting from them by their mass, strike the walls of the shaped blades, which capture these particles, separating them from the outgoing air flow.

[0017] Figure 5 shows schematically an alternative embodiment of the electrical connection and the various connections, externally, of the at least one fire extinguishing device 2.

[0018] As is known, heating of the cylindrical package of solid substance contained in the extinguishing device 2 is performed by means of an activator in the form of an igniter 10 situated, for example, inside the cylindrical package of solid substance convertible into aerosol. Such an igniter device is preferably of the extractable type for easier maintenance without the need for disassembly of the at least one extinguishing device 2 in its entirety. For this purpose a fire extinguisher 2 of the conventional aerosol type has, inserted therein, a guided and separately removable igniter 10.

[0019] This igniter 10 is connected externally to the grille 6 via a first cable-guide holder and/or male connector 11, which is in turn placed in electrical contact with a connector 12 which is electrically connected via a bipolar cable 12a to an intermediate male connector 13 connected to a further female connector component 14 which leads to the central control unit. If the box-shaped body has a second extinguishing device 2', with an extractable igniter, the connection to the connectors 13 e 14 is repeated symmetrically via the contact holder 11, which is interconnected with a second extractable igniter of said second aerosol extinguisher device 2'.

[0020] According to this embodiment, in order to perform maintenance of the igniter 10 it is possible to disconnect the connector components 12, 13 and 14, then remove the internal cylindrical guide integral with the igniter from the outer cylindrical guide which remains in-

serted, fixed in the at least one extinguishing device, and replace the igniter, without removing the at least one extinguisher 2, 2' from the fixed position inside the box-shaped casing 1.

[0021] During operation, the solid aerosol substance inside the cylindrical package contained in the extinguisher 2 is heated to the appropriate temperature by the activator, is converted into aerosol and the aerosol is discharged through the holes 7 in the casing of the extinguisher 2. The suspended granules of the product converted into aerosol have a maximum diameter of 4 microns. In the vicinity of the flame, the aerosol interferes chemically with the combustion reaction chain, removing the free radicals (OH), which are thus no longer available for fuelling the combustion, and physically drawing energy from the combustion environment. Since the two actions occur on the surface of the solid aerosol particles, the smaller the size of the particles, the greater will be the reaction area available and the more effective will be the extinguishing action.

[0022] In order to prevent incandescent particles bigger in size than those which normally form the aerosol from escaping, a grille of the labyrinth type 6, for example such as those used for suction hoods, is provided, removably fastened to the box-shaped casing 1. This grille 6 not only does not hinder the expulsion of the extinguishing powder, but on the contrary increases it and favours operation since the spiral or labyrinth grille, during expansion of the powder, retains the particulate formed by carbonaceous, sticky, oily and clingy residues in the form of large-size particles. During the extinguishing process, these particles which are incandescent and conveyed by the cloud of gas and aerosol may come into contact with persons present within the radius of action of the device and by their nature do not help extinguish the flame.

[0023] Persons skilled in the art will understand that a flush-mounted fire extinguisher assembly as described above may be applied to an aerosol fire extinguishing device operating not with an activator or igniter, but with other means for raising the temperature of the solid substance up to its aerosol conversion temperature.

[0024] With an arrangement of the flush-mounted fire extinguisher assembly according to the present invention, both aesthetic and functional advantages are achieved. Aesthetic advantages in particular are obtained for example in the case where the entire assembly is flush-mounted inside ceilings, false ceilings, walls or the like, since only its labyrinth or spiral grille surface 6 is visible. Functional advantages are achieved for example from the point of view of the space occupied or obstructions, in particular in the case of service rooms and data processing centres where the spaces are limited and any protrusion may be a hindrance. Moreover, the arrangement according to the present invention results in easier and less costly assembly and maintenance compared to the known arrangements; in fact, with the arrangement comprising at least one extinguishing device which can be combined with a further extinguishing

device, it is possible to use smaller size extinguishers for the same effective surface area covered, with easy installation, assembly and maintenance, this not being possible with the known arrangements.

[0025] The embodiment described and illustrated is shown purely by way of example, although it is understood that numerous constructional variations may be made without thereby departing from the scope of protection of the present invention.

Claims

1. Flush-mounted fire extinguisher assembly, **characterized in that** it comprises a box-shaped body (1) suitable for being flush-mounted in walls, double walls, ceilings, false ceilings and the like, the side thereof which faces the room being closed by a covering panel (6) formed by a labyrinth grille with a filter function, the box-shaped body (1) containing internally at least one aerosol extinguishing device (2, 2'). 15

2. Flush-mounted fire extinguisher assembly according to Claim 1, **characterized in that** the at least one extinguisher (2) inside the box-shaped body (1) is kept in position by a shaped seat (5) removably fastened to the said box-shaped body (1). 25

3. Flush-mounted fire extinguisher assembly according to Claim 1, **characterized in that** the at least one extinguisher (2) is formed preferably by a cylindrical body with holes on its outer surface, housing internally a cylindrical package of solid substance convertible into aerosol. 30

4. Flush-mounted fire extinguisher assembly according to any one of the preceding claims, **characterized in that** the labyrinth grille (6) comprises shaped blades (60, 61) able to prevent incandescent and dangerous particles of solid substance from being emitted into the room. 35

5. Flush-mounted fire extinguisher assembly according to any one of the preceding claims, **characterized in that** an activator which can be activated externally is located inside the solid substance for ignition thereof. 40

6. Flush-mounted fire extinguisher assembly according to any one of the preceding claims, **characterized in that** a guided and separately removable igniter (10) is inserted inside the at least one conventional aerosol extinguishing device (2) as an activator. 45

7. Flush-mounted fire extinguisher assembly according to any one of the preceding claims, **characterized in that**, in each of the at least one extinguisher 50

(2), the guided and removable igniter (10) is connected externally to the grille (6) via a first cable-guide and/or male connector (11) in turn placed in electrical contact with a connector (12) which is electrically connected via a bipolar cable (12a) to an intermediate male connector (13) connected to a further female connector component (14) which leads to the control unit. 55

8. Use of grille filters (6) of the labyrinth type for capturing carbonaceous, sticky and/or oily residues in the form of particles expelled from aerosol extinguishers and produced during operation of said extinguishers. 60

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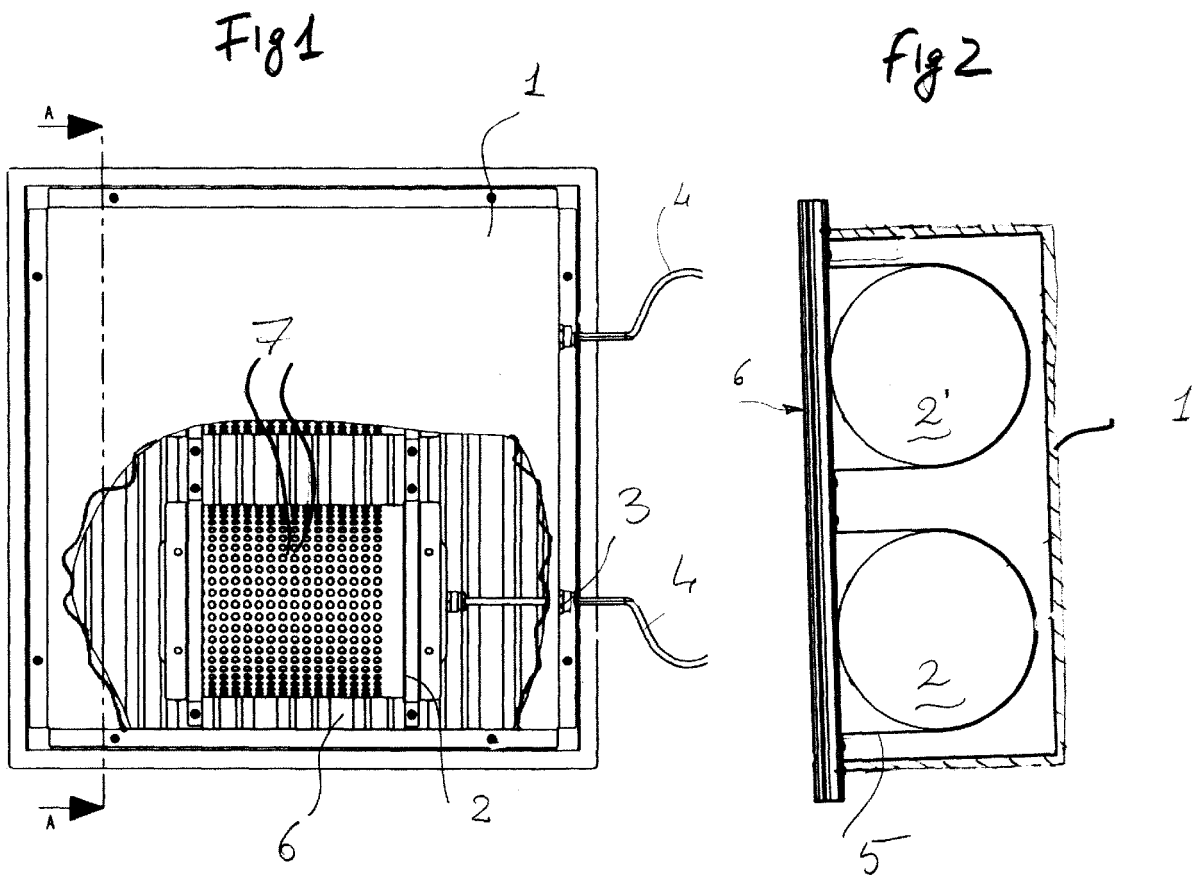
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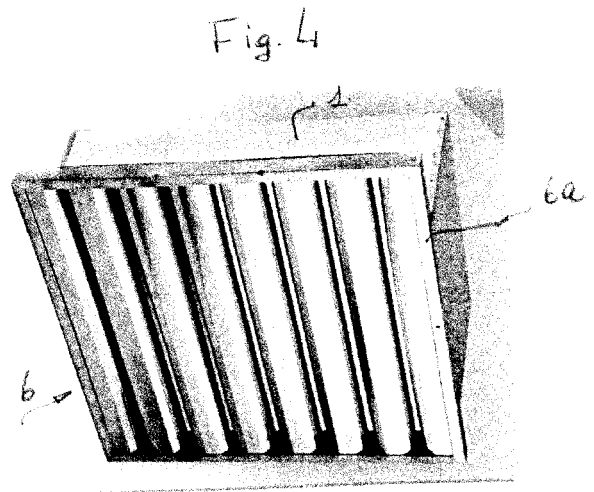
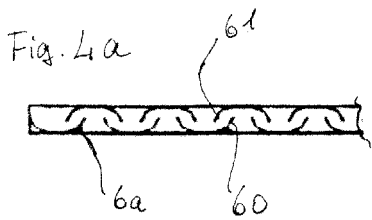
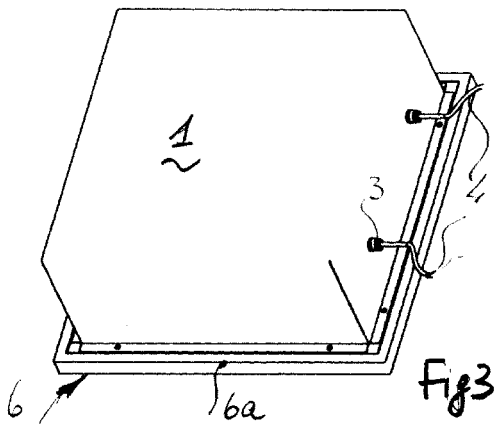
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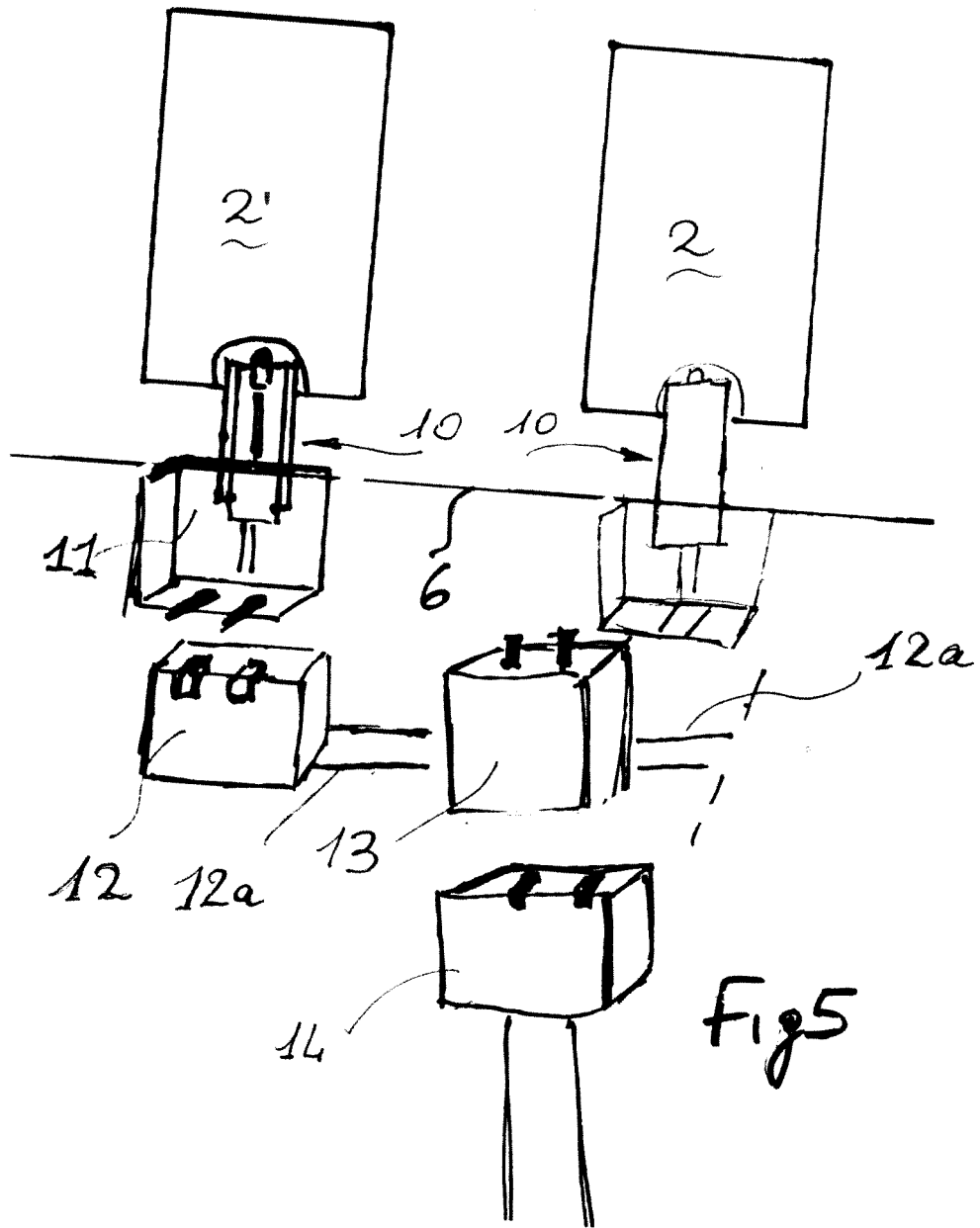
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ANNEX TO THE EUROPEAN SEARCH REPORT
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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