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(54) **Ignition device for fire extinguishers**

(57) The invention relates to means which form a guiding device for an electric ignition unit intended for fire extinguishers which use an aerosol or similar mixtures,

consisting of an independent, removable and interchangeable assembly.

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Description

Field of the Invention

[0001] The present invention relates to an electric ignition device for fire extinguishers of the aerosol type.

[0002] In particular, the invention relates to means in a mutually cooperating arrangement which form a guiding device for the electric ignition unit intended for fire extinguishers of the type which use an aerosol or similar mixtures, consisting of a modular, independent, removable and interchangeable assembly.

Background

[0003] According to the present invention, "fire extinguishers" or "extinguishers" is understood as referring to fire extinguishers of the type which use a solid substance, preferably based on potassium salts or similar mixtures, which are activated by ignition, thus generating the extinguishing mixture.

[0004] By way of example, the solid substance may be composed of 90% potassium nitrate and has an aerosol conversion temperature at about 400°C.

[0005] The extinguishing capacity of 1 kg of potassium nitrate is equivalent to the extinguishing capacity of 1 m³ of water. In addition, the exothermally formed nitrate is completely anhydrous and may therefore be used to extinguish a fire at its outbreak, even in the presence of electrical apparatuses, without the risk of conduction caused by electrolytic phenomena associated with the potassium salt.

[0006] These types of fire extinguishers, as described for example in WO 2007/040560, have a hollow body which internally includes a chamber which communicates with the exterior by means of openings and which houses a solid substance which, activated by means of an igniter, also called activator, provided inside the solid substance itself, is converted at a given temperature into an aerosol with fire-extinguishing properties and is discharged as an aerosol through the openings of said hollow body.

[0007] The igniter is connected to and/or forms part of a control circuit, which is either electrically operated or battery operated, and is placed within the solid substance for activation thereof and may be operated externally. By way of example, the igniter may be a resistance, placed near or within the solid substance, thus ensuring suitable activation of the solid substance.

[0008] Preferably, the solid substance is completely surrounded by inert material, such as stones, alumina beads or ceramic material. The purpose of the inert material is to absorb the heat generated at the time of ignition or activation of the solid substance.

[0009] To ensure correct and safe operation of the abovementioned fire extinguishers it is required to perform periodic maintenance which involves replacement of the activator or igniter, so that the guarantee may be

renewed.

[0010] In the existing fire extinguishers, this operation requires that the extinguisher be returned to the maintenance company so that it can be completely disassembled, the igniter replaced and the extinguisher reassembled after a new igniter has been placed in the correct position and after reintroducing the inert material which completely surrounds the solid substance and the igniter.

[0011] All these operations are essential, since it is impossible to remove the igniter and insert a new one without the inert material hindering access to the solid substance to be activated.

[0012] There exists therefore the need to remedy the drawbacks of the prior art by providing means which allow replacement of the igniter without having to disassemble and empty the entire extinguisher, and which allow the igniter to be correctly positioned, also without removing the inert material which fills the abovementioned extinguishers. Such means preferably consist of an electric igniter for fire extinguishers of the aerosol type as mentioned above, formed by an independent modular assembly which can be easily and safely removed and exchanged such that the periodic maintenance may be performed without having to disassemble the entire fire extinguisher in order to replace and correctly position the igniter.

Summary of the Invention

[0013] It is an object of the present invention to provide means which form a guiding device for the ignition unit, said means constituting a modular, independent and separate component which allows replacement of the igniter in situ, without having to return the fire extinguisher to the manufacturer, or disassemble and then reassemble the said extinguisher after positioning the igniter.

[0014] Another object of the present invention is to provide a low-cost ignition device which may be replaced in a simple, safe and practical manner in place of the igniters which are currently used in aerosol fire extinguisher of the known type.

[0015] The present invention therefore relates to an ignition device for aerosol fire extinguishers which comprises the following means in a mutually cooperating arrangement:

- a first cylindrical element operatively connected to the closing cover of the fire extinguisher; said first cylindrical element extends towards the inside of the said extinguisher with its end positioned near to the solid substance to be converted into aerosol;
- a second cylindrical element which is coaxial with the first element and which houses in its end the end part of the igniter.

[0016] Said second cylindrical element constitutes a guide for the end part of the igniter, thus positioning it in the appropriate seat provided within the solid substance,

with the inert material which surrounds the solid substance neither hindering nor preventing incorrect positioning, as it happens with the fire extinguishers of the known type.

[0017] In particular, according to the invention, the means which form a guiding device for the ignition unit comprise a double cylindrical body consisting of two coaxial cylinders, i.e. a first outer cylinder in contact with the inert material and a second inner cylinder inside which the igniter is inserted with its end part. This double cylindrical body is fastened in a removable manner to the closing cover of the fire extinguisher by means of a threaded ring nut which also has, fixed thereto, a cable-holder module and/or connector for electrically connecting together the igniter and the ignition operating device.

[0018] The present invention will now be described in greater detail with reference to the figures of the accompanying drawings in which:

Figure 1 shows a section view of an embodiment of the means which form the ignition unit as a whole;

Figure 2 shows a schematic view, along the plane indicated by I-I in Figure 1, of the means which form the ignition unit; and

Figure 3 shows a schematic, partly cut-away view of the arrangement of the means which form the ignition unit inserted in a fire extinguisher.

[0019] With reference to Figures 1 to 3, these show the means which form the guiding device for the ignition unit, comprising essentially an outer cylindrical body 1, which is fastened to a closing cover 5 of the fire extinguisher for example by means of a thread 7 and lock nut 7', and an inner cylindrical body 2, which is coaxial with the outer cylindrical body 1 and which forms a guide for said inner cylindrical body 2.

[0020] The inner cylindrical body 2 receives internally an igniter 3 with its conventional end part and with the associated electrical connection 4 for performing ignition.

[0021] The inner cylindrical body 2 is fastened, for example by means of a thread 8, to a ring nut 6 which has an outer surface which is preferably knurled, shaped or the like so as to facilitate gripping. This ring nut 6 has a threaded seat 9 suitable for receiving the part of the outer cylindrical body 1 which projects outside of the closing cover 5 of the fire extinguisher.

[0022] In an alternative embodiment the ring nut 6 is provided with a further threaded seat 10 which is placed opposite the threaded seat 9 and inside which a cable-gripping terminal or connector 11 is inserted.

[0023] The device according to the invention therefore forms an independent modular component which may be removed from the fire extinguisher by unscrewing the ring nut 6 from the outer cylindrical body 1 which remains instead in position, fixed to the cover 5 by fixing means (not shown) such as a double flange, nut and lock nut

and the like, so as to form a guide for the inner cylindrical body 2 for correct positioning of the igniter 3 inside the seat provided in the solid substance through the mass of inert material which fills the fire extinguisher. In another embodiment the closing cover 5 of the fire extinguisher and the outer cylinder 1 are made such they form one piece.

[0024] The igniter 3 comprises electrical connections 4 and a head 3' which is connected to a cylindrical body 3" shaped so as to slide inside the inner cylinder 2 as far as its end, so as to allow the head 3' to project outside of the double cylindrical body so as to be correctly positioned with respect to the solid substance to be ignited.

[0025] With the arrangement according to the present invention the igniter 3 may be easily replaced inside the inner cylinder 2 for the required maintenance, without having to remove the fire extinguisher from its position and without having to return the extinguisher to the maintenance company, with the result that the periodic replacement of the ignition means is particularly easy, rapid and inexpensive. The advantage in terms of practicality of the ignition device for fire extinguishers according to the present invention is evident, since it is possible to perform replacement of the igniter without having to remove the entire extinguisher, with an obvious reduction in the amount of time required and transportation costs. In this case the extinguisher system will be restored to its operative condition quickly and the protection maintained so as to guarantee safety.

[0026] The connections between the cylindrical inner body 2 and the ring nut 6 as well as between the outer cylindrical body 1, the cover 5 and the ring nut 6 are performed by way of example using threading, but any other known type of connection, e.g. a bayonet, groove-type or similar connection, is possible.

[0027] It can be understood that the dimensions and the shape of the device, as well as the materials which form it, may be suitably chosen so as to avoid any possible problems for the user.

[0028] The embodiment described and illustrated is shown purely by way of example, although it is understood that numerous constructional variants are possible, without thereby departing from the scope of protection of the present invention.

Claims

1. Ignition device for extinguishing mixtures contained in aerosol fire extinguishers provided with a closing cover (5) and ignition means (3), **characterized in that** it comprises a hollow outer cylindrical body (1) which is fastened to the cover (5) and is suitable for connection to a ring nut (6) which has, fastened thereto, an inner cylindrical body (2) coaxial with the outer cylindrical body (1) and housing the igniter (3) so that the inner cylindrical body (2) can be extracted independently of the outer cylindrical body (1), said

outer cylindrical body (1) and said inner cylindrical body (2) forming a double cylindrical body.

2. Ignition device according to Claim 1, **characterized in that** the outer cylindrical body (1) is fastened to the cover (5) by means of a thread (7) and a lock nut (7'). 5
3. Ignition device according to Claim 1, **characterized in that** the outer cylindrical body (1) forms a guide for the inner cylindrical body (2) which in turn forms a guide for the igniter (3). 10
4. Ignition device according to Claims 1 to 3, **characterized in that** the igniter (3) comprises electrical connections (4) and a head (3') connected to a cylindrical body (3'') shaped so as to slide inside the inner cylindrical body (2) up to its end part. 15
5. Ignition device according to Claim 1, **characterized in that** the inner cylindrical body (2) and the cylindrical body (3'') of the igniter (3) are formed as one piece. 20
6. Ignition device according to Claims 4, 5, **characterized in that** the head (3') of the igniter (3) projects outside of the double cylindrical body formed by the outer cylindrical body (1) and the inner cylindrical body (2). 25
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7. Ignition device according to Claim 1, **characterized in that** the outer cylindrical body (1) and the closing cover (5) are formed as one piece.
8. Ignition device according to Claim 1, **characterized in that** the inner cylindrical body (2) is fastened to the ring nut (6) by means of a threading, bayonet connection or groove-type connection. 35
9. Ignition device according to Claim 1, **characterized in that** the ring nut (6) has a threaded seat (9) for receiving the part of the outer cylindrical body (1) which projects outside the closing cover (5) of the fire extinguisher. 40
45
10. Ignition device according to Claim 1, **characterized in that** the ring nut (6) has a knurled or shaped outer surface and is provided with a further threaded seat (10) which is placed opposite the threaded seat (9) and inside which a cable-gripping terminal or connector (11) is inserted. 50
11. Aerosol fire extinguisher provided with an ignition device according to any one of Claims 1 to 10. 55

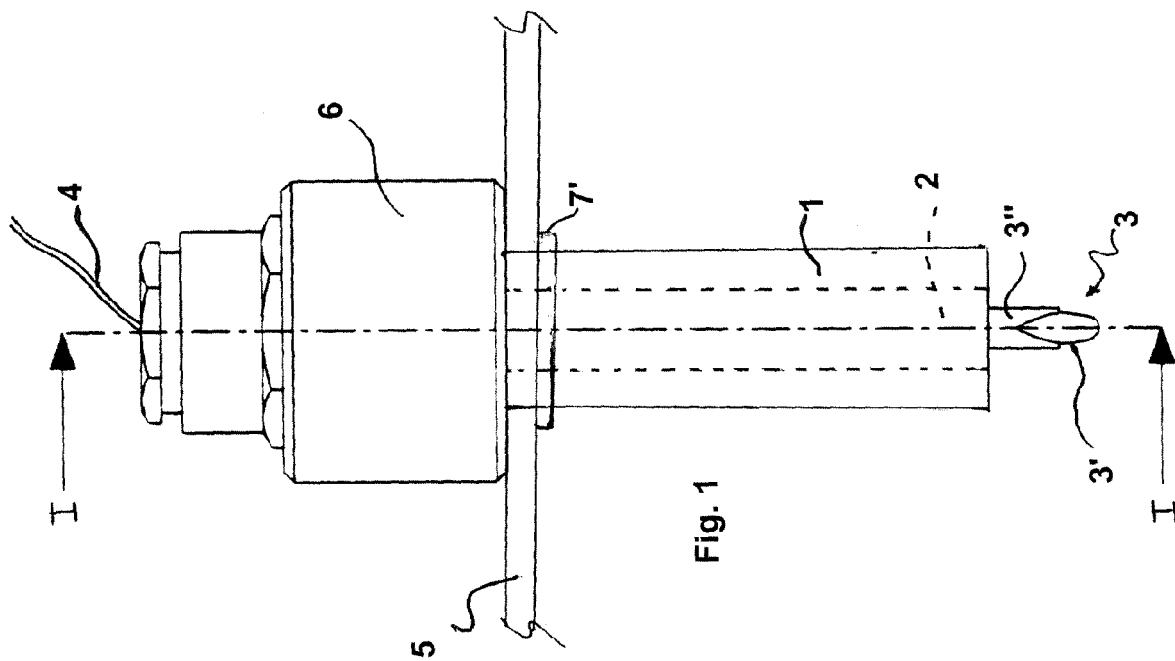


Fig. 1

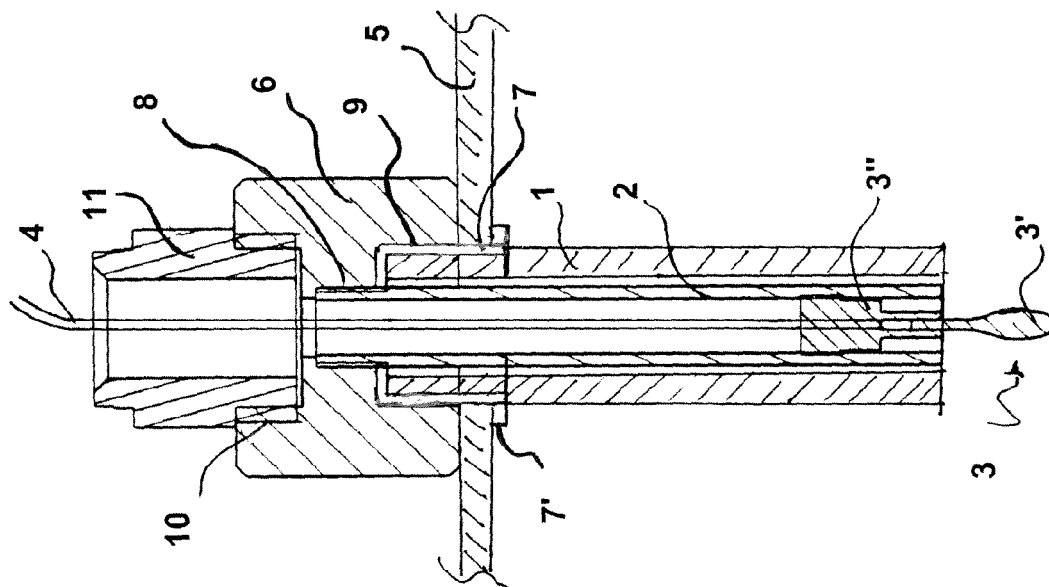


Fig. 2

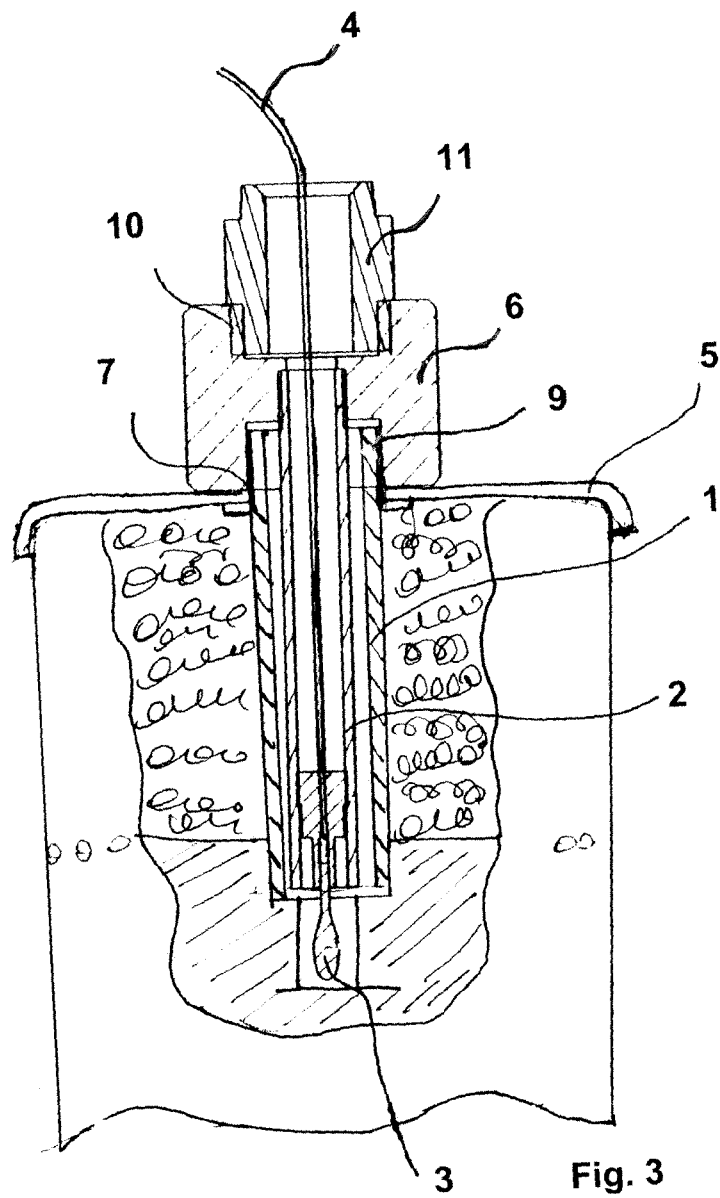


Fig. 3



EUROPEAN SEARCH REPORT

Application Number
EP 09 18 0086

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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A	* paragraph [0019]; figure 3 *	5	
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A	* column 3, lines 20-25; figure 1 *	6	
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A	* figure 1 *	7	
A	DE 31 39 181 A1 (SOBBE FRIEDRICH WILHELM) 21 April 1983 (1983-04-21)	7	TECHNICAL FIELDS SEARCHED (IPC) A62C A62B F42B F42C
A	* page 6, lines 6-10 *	8	
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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 9 March 2010	Examiner van Bilderbeek, Henk
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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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 09 18 0086

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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