(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 4 306 182 A1**

(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 153(4) EPC

(43) Date of publication:
17.01.2024 Bulletin 2024/03

(21) Application number: **22766428.1**

(22) Date of filing: **07.03.2022**

(51) International Patent Classification (IPC):
A62C 17/00 *(2006.01)*

(52) Cooperative Patent Classification (CPC):
A62C 17/00; A62C 5/006; A62C 13/22

(86) International application number:
PCT/ES2022/070130

(87) International publication number:
WO 2022/189687 (15.09.2022 Gazette 2022/37)

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

(30) Priority: **12.03.2021 ES 202130510 U**

(71) Applicant: **Perez Calle, Eduardo**
46950 Xirivella Valencia (ES)

(72) Inventor: **Perez Calle, Eduardo**
46950 Xirivella Valencia (ES)

(74) Representative: **Sahuquillo Huerta, Jesús**
Jesana Patentes, SL
Jesana iP
C/ Huesca 5 ,Oficina 2
46001 Valencia (ES)

(54) **FIRE EXTINGUISHING CARTRIDGE**

(57) The invention relates to a fire extinguishing cartridge operated by an actuating device (1) characterised in that it comprises a compacted pyrotechnic composition generating extinguishing gases (2) inside a container (3), wherein said container (3) is closed by a throttling closure (4) at the top and by pyrotechnic activation means (5) at the base.

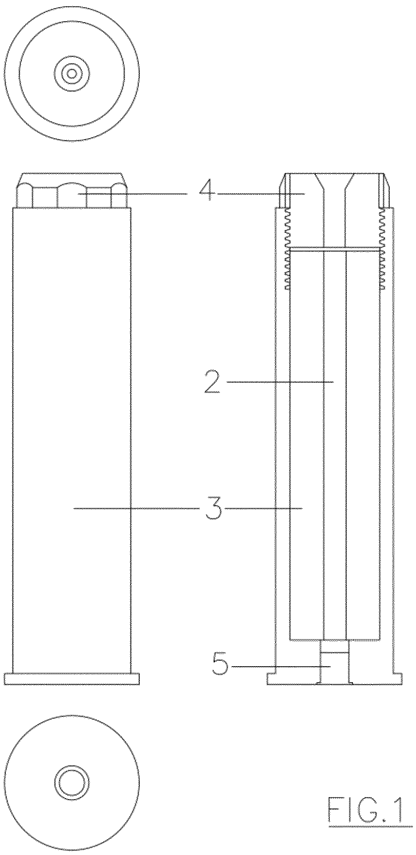

FIG.1

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Description

Object of the invention

[0001] The object of the present specification is a cartridge-operated fire extinguisher, which will make it possible to extinguish fires by sublimation of a pyrotechnic compound and the discharge of the resulting gases with the capacity to significantly displace oxygen following activation in the manually operated device.

Background of the invention

[0002] There are currently a wide range of solutions on the market to extinguish small fires depending on the type of fire in question. The different types of fires are determined by the physical state of the fuels that start them, and can be summed up in 3 classes: class A fires involve ordinary combustible materials such as wood, cardboard, paper and fabrics, etc.; class B fires involve flammable and combustible liquids such as such as petrol, alcohol, waxes and greases, etc.; and class C fires involve gaseous fuels such as butane, natural gas, propane and methane, etc.

[0003] The solution proposed herein would be a class-B fire extinguisher, a category which includes all high-pressure CO2 extinguishers, such as those usually found in public and residential spaces such as hospitals, universities, apartment blocks, etc. There are a number of downsides to these small extinguishers, including the fact that they are stored-pressure fire extinguishers governed by regulations and maintenance requirements, as well as handling precautions, incurring the associated costs of maintenance that must be performed by a specialised company.

[0004] Furthermore, it must be considered that, in stored-pressure fire extinguishers, the container is much heavier than the product itself, as the agent and pressure are mixed in the same container inside the extinguisher, meaning that these extinguishers must be placed in fixed points, thereby reducing user's chances of reacting to a fire breaking out unexpectedly, and requiring that they go and find the nearest extinguisher.

[0005] At the same time, these extinguishers usually generate a quantity of extinguishing gases that in no case exceeds 200 times the volume of the container, as well as the production of carbon-dioxide snow, ice crystals or moisture due to condensation.

Description of the invention

[0006] The technical problem solved by this invention is the extinction of fires by means of an extinguishing gas-generating composition operated by a manually actuated mechanism. For this purpose, the cartridge-operated extinguisher, subject of this invention, comprises a compacted pyrotechnic composition that generates extinguishing gases inside the cartridge, which corresponds, in turn, to a container with a seal to prevent gases from escaping in its upper part and a compound-initiation system in its base.

[0007] Due to the versatility of this solution, it can be used quickly by a user with the utmost safety. Simply insert the cartridge into the manually operated actuating mechanism and activate it, and then repeat this process with as many cartridges as there are available, discharging up to 600 times the volume of compacted composition producing extinguishing gases that will put out the fire while avoiding the control regulations currently in force for stored-pressure extinguishers, as it is a dry pyrotechnic compound not stored under pressure.

[0008] Due to its design, the cartridge-operated fire extinguisher can be used by manually operated actuating mechanisms designed for this purpose.

[0009] In turn, the fact that it can be easily used by any user means that small fires can be put out more quickly or even instantly, as it generates a jet of extinguishing gases with a duration determined by the size and volume of the cartridge selected, since it can be used to put out the fire as soon as it breaks out, even in the outbreak phase, preventing it from spreading at the crucial moment when it is easiest to extinguish, and not once it has already had time to spread.

[0010] Moreover, the container and throttle valve are both made of high-temperature resistant materials.

[0011] Although the extinguishing cartridge is designed for extinguishing fires, it could ideally also be used for other purposes such as detecting leaks in ducts or creating a smoke signal, among others.

Brief description of the drawings

[0012] Below, a series of drawings are briefly described that help to better understand the invention, and which are explicitly related to an embodiment of this invention presented as a non-limiting example thereof.

FIG.1 Shows a front and profile view of the cartridge-operated fire extinguisher, subject of this invention.

FIG. 2 Shows a schematic view of the use of the cartridge-operated fire extinguisher, subject of this invention.

Description of a detailed embodiment

[0013] The attached figures present a preferred embodiment of the invention. To be more precise, the extinguishing cartridge comprises a compacted pyrotechnic composition that generates extinguishing gases (2) inside a high-temperature-resistant container (3) which, in turn, comprises a closure (4) made from high-temperature-resistant materials to restrict the discharge of gases in its upper part and a pyrotechnic-activation system, either by percussion or pyroelectric ignition, (5) in its base.

[0014] In accordance with a non-limiting practical embodiment of the invention, a high-temperature-resistant material is any metallic material.

[0015] In a second practical, non-limiting embodiment, the container is between 120 and 140 millimetres long and between 20 and 50 millimetres in diameter.

[0016] In a third practical and non-limiting embodiment, the compacted pyrotechnic composition that generates extinguishing gases weighs between 40 and 70 grams and discharges for a maximum of 4 seconds after the cartridge is activated.

[0017] The cartridge-operated fire extinguisher is designed to be initiated by percussion or pyroelectric ignition, resulting in the ignition of the cartridge and the directional discharge of a jet of white and/or greyish extinguishing gases.

[0018] In terms of use, the extinguishing cartridge must be kept in its container until it is to be used, when the cartridge shall be placed in the receptacle of the actuating mechanism. Upon activation, the actuating mechanism must be held firmly with both hands and pointed in the direction in which the extinguishing gases are to be discharged. The cartridge shall then be discharged from the actuating mechanism, with as many cartridges as required to put out the fire, used one after the other.

Claims

1. Cartridge-operated fire extinguisher operated by an actuating mechanism (1) comprising a compacted pyrotechnic composition generating extinguishing gases (2) inside a container (3), wherein the container (3) is closed by a throttling closure (4) at the top and by pyrotechnic actuator (5) at the base.

2. Cartridge-operated fire extinguisher according to embodiment 1 wherein the pyrotechnic actuator (5) corresponds to a pull pin or a pyroelectric igniter.

3. Cartridge-operated fire extinguisher according to embodiments 1 and 2 wherein the container (3) is between 120 and 140 millimetres long and between 20 and 50 millimetres in diameter.

4. Cartridge-operated fire extinguisher according to embodiments 1 to 3 wherein the compacted pyrotechnic composition generating extinguishing gases weighs between 40 and 70 grams and discharges for a maximum of 4 seconds after the cartridge is activated.

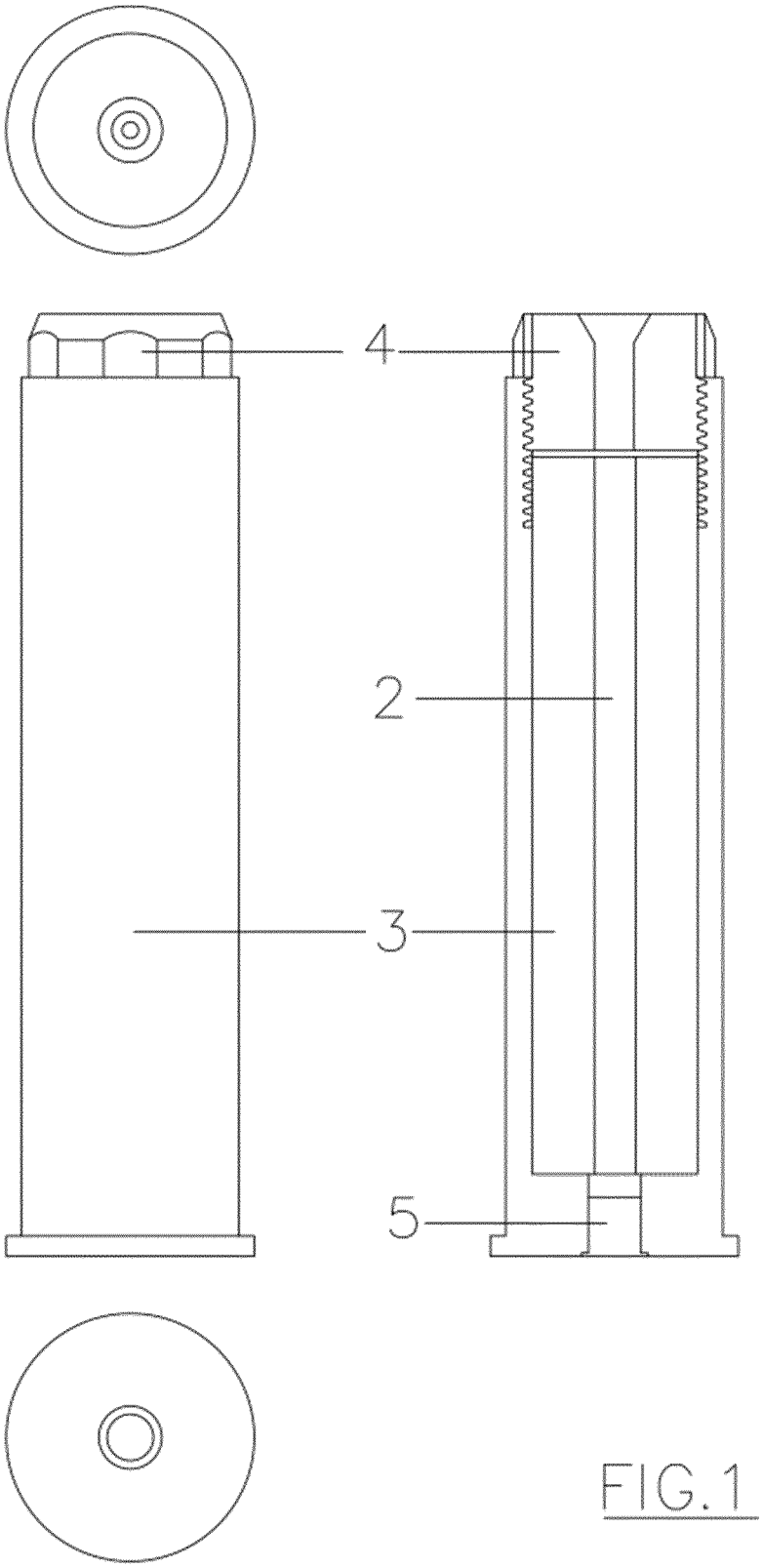

FIG.1

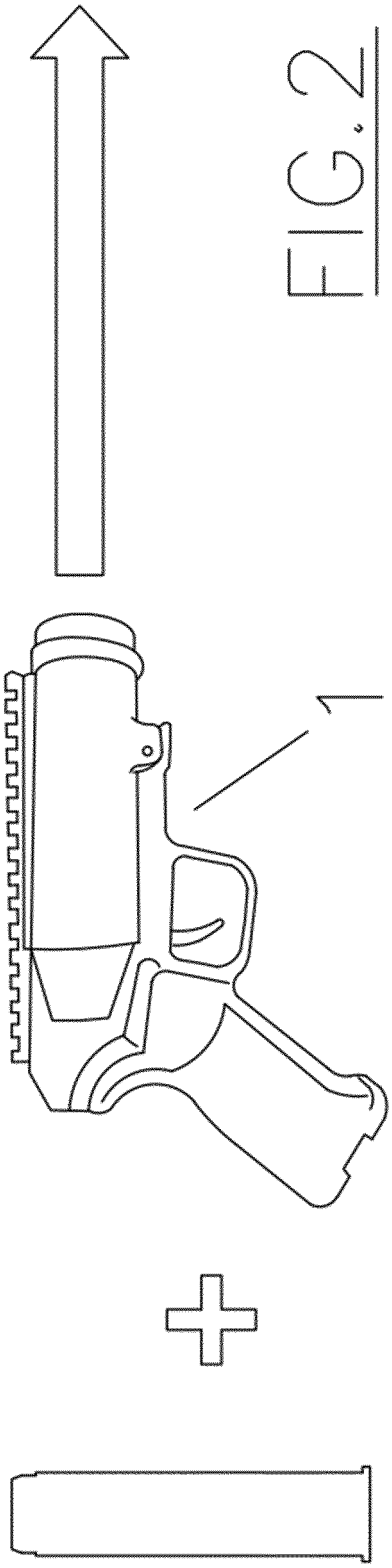

FIG. 2

INTERNATIONAL SEARCH REPORT

International application No.
PCT/ES2022/070130

A. CLASSIFICATION OF SUBJECT MATTER

A62C17/00 (2006.01)

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
A62C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPODOC, INVENES, WPI

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2020036569 A1 (BOLSHAK YURIY NIKOLAEVICH ET AL.) 20/02/2020, Paragraph [0021] – [0034]; figures 1-4	1-4
X	KR 102015942B B1 (JANG SANG WOOK) 29/08/2019, Figure 1. &Abstract from DataBase EPODOC (Retrieved from WPI AN 2019-75395B)	1-4
X	EP 0638334 A1 (GLORY KIKI CO LTD) 15/02/1995, Description; figures 1 - 7	1-4
X	CN 210698578U U (JIANGSU JISHIYU FIRE FIGHTING EQUIPMENT CO LTD) 09/06/2020, Figures 1 - 2. &Abstract from DataBase EPODOC (Retrieved of WPI AN 2020-53316A)	1-4

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:
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"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other documents , such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
30/06/2022	**(01/07/2022)**
Name and mailing address of the ISA/ OFICINA ESPAÑOLA DE PATENTES Y MARCAS Paseo de la Castellana, 75 - 28071 Madrid (España) Facsimile No.: 91 349 53 04	Authorized officer P. López Calvo Telephone No. 91 3495413

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/ES2022/070130

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Form PCT/ISA/210 (patent family annex) (January 2015)