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(54) Device with combustible charge with smoke-generating, tear-generating or signaling effects

(57) Device with combustible charge with smoke-generating, tear-generating or signaling effects, which comprises a casing (1) housing a series of charges (2) traversed by an ignition cord (16), which casing is closed by means of a cover (3) which delimits an inner chamber (25) and carries a fuse (18). Between the charges (2) and the end wall (6) of the casing (1) there is a spacer (7') which defines a chamber (8), between said end wall (6) and the nearest charge (2), and which may consist of a cylindrical wall, inside which are housed one or more parachutes (26), to each of which a charge (2) is connected.

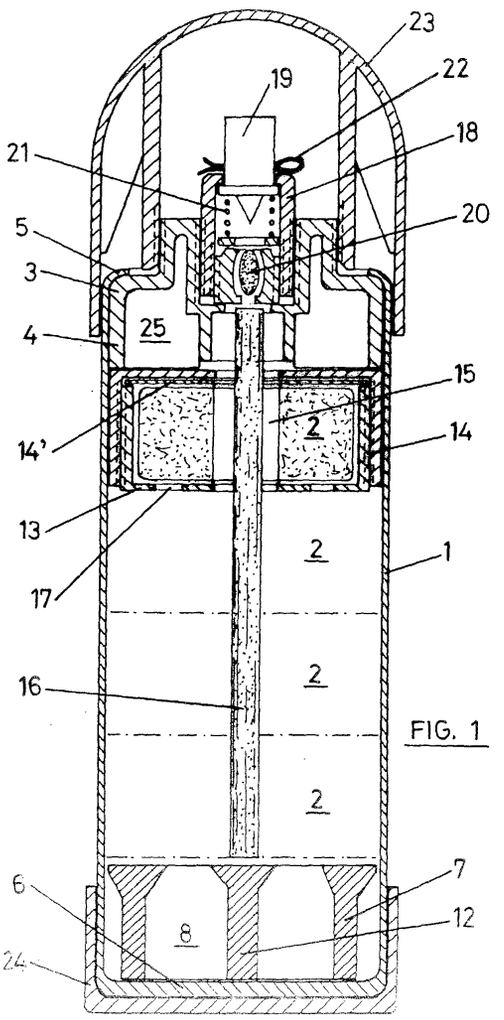

FIG. 1

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Description

[0001] The present invention relates to a device with combustible charge with smoke-generating, tear-generating or signaling effects, which can be used as an antiriot device or as a means of signaling, and which can be thrown by hand or with the aid of a firearm.

[0002] Traditionally, devices for the above purpose, known as "smoke pots" are compact units which do not break up, are activated after they have been launched from a firearm, and once on the ground they release the relevant gas.

[0003] This type of device has a series of drawbacks, such as the risk of producing impact injuries, the fact that combustion of the devices generates flames, etc. In addition, each pot is a single gas-producing unit, and therefore its effectiveness is limited.

[0004] In order to solve the above problems, devices are known which comprise casing housing a series of charges of a combustible, smoke-generating, tear-generating or signaling mixture, which charges have a coaxial passage through which an ignition cord passes. The casing is closed by means of a detachable cover which carries a fuse, activation of which gives rise to ignition of the mixture and thereby ignition of the charges. These devices are constructed so that, when fired and after combustion of the charges has begun, they give rise to opening of the casing and the exit and dispersal of the charges, each one of which is converted into a gas-producing unit.

[0005] With the above construction, the risks of impact injuries are reduced, and greater effectiveness is achieved, since each smoke-generating device will give rise to as many gas-producing units as there are charges in the casing.

[0006] A device of the above type is described in EP 0369922 from the same applicants. The device contains three or more independent cylinders, which are axially perforated, each one of which contains a smoke-generating or tear-generating mixture. When the device is fired, the cylinders disperse into the air, each emitting a thick cloud of smoke. In accordance with this patent, the device comprises a low-pressure chamber which is delimited between the cover and the cylinders, this chamber housing the gases produced in the initiation reaction, once the fuse has been activated, in order to give time for initiation of the combustion of the smoke-generating mixture in the cylinders and for the necessary pressure to be achieved in order to cause detachment of the cover and the exit of the cylinders from the casing, said cylinders being dispersed into the air, thereby achieving greater range and effect.

[0007] With the above construction, the exit of the cylinders containing the smoke-generating charges may present certain problems, as there is no effective action inside the casing to push the cylinders toward the outside thereof.

[0008] Moreover, in these devices it is customary for the cover to be fixed to the body by being screwed on, which may require excessive internal pressure to cause detachment of said cover.

[0009] A subject of the present invention is a smoke-generating device of the type described in EP 0369922, but one which provides greater security and operational effectiveness.

[0010] Moreover, in accordance with the present invention, the cover is joined to the casing by easily-shaped retention means which can be removed to allow detachment of the cover when the preset internal pressure has been achieved.

[0011] Moreover, in accordance with the present invention, the smoke-generating device has means which ensure expulsion of the cylinders or combustible charges outside the casing once the cover has become detached, and also their separation or dispersal, in order to increase the radius of action and the effectiveness of the device.

[0012] In accordance with the present invention, the casing cover is coupled partially in a tight-fitting manner inside said casing and is held by means of external flanging of the wall of the casing on the cover.

[0013] The conventional screw threads are eliminated, these being replaced by a simple operation of crimping the wall of the casing on the outer surface of the cover, thereby having a means of securing whose force or retention effect will depend on the type of material constituting the wall of the casing and on the size of the crimped portion. Generally, the casing will be made from aluminum or plastic, with a thin wall, so the crimping operation can be carried out easily, safe securing of the cover being achieved and, at the same time, relative ease of release or detachment thereof by means of an internal pressure.

[0014] According to another characteristic of the invention, between the combustible charges and the end wall of the casing there is a spacer whereby a preset gap is maintained between the end wall of the casing and the nearest charge, thereby defining a chamber in which, once combustion of the charges has been initiated, the combustion gases will be progressively stored until they reach a sufficient pressure to cause detachment of the cover and expulsion of the charges outside the casing.

[0015] With the above construction, once the fuse has been activated, initiation of combustion of the charges will generate gases which are stored both in the chamber defined by the cover and in the chamber defined by the spacer. When this chamber reaches a high enough pressure, the charges are impelled outward, causing the cover to open and all the charges to exit.

[0016] In order to achieve maximum effectiveness, the portion of the cover which is inside the casing rests on the combustible charges in order to push them against said spacer so that, when the pressure in the chamber defined by the spacer reaches the preset value, the pressure exerted on the charges acts directly on

the cover in order to destroy the crimping which constitutes the means of holding said cover on.

[0017] The device of the invention may be launched by hand or with the aid of a firearm, using the relevant blunderbuss piece, into which it will be possible to insert the device in either direction. Depending on the direction in which the device is inserted, the range achieved will be different, being greater when the device is inserted into the blunderbuss piece with the cover outward and the flat end wall inward.

[0018] As is customary, the fuse will have an easily-broken safety pin which will prevent activation of the fuse during its transportation and handling.

[0019] If it is intended to launch the device by hand, the fuse could include a more robust pin, which would require its prior extraction by pulling on its ring in order then to launch it.

[0020] Moreover, the ignition system, based on the fuse, is designed so that ignition of the charges and production of sufficient combustion gases to cause opening of the casing and expulsion of said charges take place after the device has been launched and has gained a certain height. It is thereby guaranteed that the charges, when expelled from the casing, will disperse and allow greater effectiveness in the action of the device to be achieved.

[0021] However, as soon as the charges are expelled from the casing, they begin their free fall, soon reaching the ground.

[0022] In certain applications, it may be desirable to delay the fall of the charges, increasing the time they remain in the air, for example in order to achieve a greater range or dispersal of the charges in the event that their effect is smoke-generating or tear-generating, or alternatively to increase their effectiveness in the case of signaling charges.

[0023] To achieve the above aim, each of the charges contained in the casing is connected or linked to a parachute located in the casing and which opens when the charge is expelled outside the casing, acting as an element to brake the fall of the charge in order to increase the time it spends in the air.

[0024] In accordance with the present invention, the spacer which is arranged between the end wall of the casing and the combustible charges consists of a cylindrical wall which runs close to the wall of the casing and which delimits a space housing one or more parachutes, as many parachutes as the casing holds combustible charges, each one of said parachutes being connected to the housing of one of the combustible charges.

[0025] The cylindrical wall rests via one of its edges on the end wall of the casing, while the innermost charge rests on the opposite edge.

[0026] A single parachute may be housed in the space defined by the cylindrical wall mentioned above, the device, inside the casing thereof, including a single charge. The housing of this casing has, on the outer surface of the end wall, a ring to which the parachute is connected.

[0027] The characteristics and advantages of the device of the invention will be better understood on the basis of the following description which is made with reference to the attached drawings which show a non-limiting illustrative embodiment.

[0028] In the drawings:

Figure 1 is a diametral section of a device constructed in accordance with the invention.

Figures 2 and 3 are, respectively, a bottom view and a front elevation of the spacer included in the device of figure 1.

Figure 4 is a view similar to figure 1, showing a variant embodiment.

[0029] The device shown in figure 1 comprises a cylinder-shaped casing 1, for example made from aluminum or plastic, which houses a series of combustible charges 2. This casing 1 is closed by means of a cover 3 which includes a wall or cylindrical skirt 4 which is inserted in a tight-fitting manner inside the wall of the casing 1 and rests on the charges 2. The wall of the cylindrical casing 1 is crimped on to the cover 3 in a portion 5 which serves as the element for holding said cover on. Between the end wall 6 of the casing and the adjacent charge 2 there is a spacer 7 which defines a chamber 8 between said charge 2 and end wall 6.

[0030] This spacer, preferably made from plastic, may consist, as shown in figures 2 and 3, of a cylindrical wall 9 which has an upper flaring 10, for example of frusto-conical shape, with a maximum diameter equal to the internal diameter of the casing 1 and to be that which defines the support surface for the adjacent charge 2. The wall 9 may be strengthened by means of internal radial partitions 11 which meet at a central nucleus 12. However, the spacer 7 could have any other configuration, provided a gap is maintained between the end wall 6 of the casing and the closest charge 2, in order to define the chamber 8.

[0031] As is customary in this type of device, the charges 2 may consist of a housing composed of a lower body 13 and an upper body 14, both with threaded walls, in which is housed the combustible material and an initiating disk 14'. The bases of the body 13 and cover 14, and of the smoke-generating material, have a coaxial hole 15 through which a cord 16 of combustible material passes. The end wall of the body or container 13 of the housings of the combustible charges may have orifices 17.

[0032] As is known in this type of device, the cover 3 carries a fuse 18, which may consist of an inertia fuse, of known construction, which comprises a chamber in which the striker 19 is mounted and which, upon movement toward the inside of said chamber, strikes a piston 20 which causes ignition of the cord 16 which in turn ignites the combustible mixture of the various charges 2 contained in the casing 1, by means of the initiator disk

14'.

[0033] The striker 19 is constantly pushed toward its outermost position by means of a spring 21 and, in addition, it is secured against any accidental displacement toward the inside of the chamber by means of an easily-broken pin 22.

[0034] As already mentioned, when the device is for launching by hand, this pin 22 may be more robust, needing to be removed before the device is launched.

[0035] With the above construction, the cover 3 is held in the casing by means of the crimping 5 of the wall thereof. The cover 3 rests via its wall or skirt 4 against the charges 2, pressing them against the spacer 7.

[0036] As is known, the device carries a cap 23 which may be fixed to the cover 3 by means of a screw thread.

[0037] The device described may be launched by hand or alternatively with the aid of a firearm, with the corresponding blunderbuss piece, in which the device may be inserted in either direction. As already mentioned, the range achieved will be different, depending on the direction in which the device is inserted in the blunderbuss piece.

[0038] When the device is launched, either by hand or alternatively using a firearm, the striker 19 acts on the piston 20, which causes ignition of the cord 15 which in turn ignites the combustible mixture of the charges 2 via the corresponding initiator disk. The gases which are produced at the start of combustion of these charges fill the chamber 8 and the chamber 25, defined between the cover 3 and the adjacent charge 2, until sufficient pressure is achieved therein for all the charges to be pushed toward the outside, destroying the crimping 5 and causing both the cover 3 and the various charges 2 to be expelled from the casing 1 and dispersed in order to achieve a greater range and effectiveness.

[0039] The time required for reaching the situation described above will be sufficient for the device to be far enough away from the launcher and also for both opening and exit of the charges to be achieved when the device is in the air.

[0040] As may be seen in figure 1, and as is conventional, the casing 1 may have an external base 24.

[0041] The combustible material of the charges 2 may have a smoke-generating, tear-generating or signaling effect, depending on the characteristics of the mixture used.

[0042] The device shown in figure 4 has a similar construction to that shown in figure 1, the same references being used to denote the same elements or components.

[0043] In the example shown in figure 4, the device includes a single charge 2 between which and the end wall of the casing 1 there is a spacer in the form of a cylindrical wall, for example based on plastic, with an external diameter equal to or slightly smaller than the internal diameter of the casing 1. This cylindrical wall serves as support element for the housing of the charge 2 and defines a chamber 8 between said charge and the end wall of the casing. A chamber 25 is also defined between the cover 3 and the charge 2.

[0044] When combustion of the charge 2 is initiated, the gases produced are progressively stored in the chambers 8 and 25 until sufficient pressure is achieved to detach the cover 3 and launch the charge or charges 2 outside the casing 1.

[0045] A parachute 26 is housed in the chamber 8', delimited by the wall of the spacer 7', and is linked or connected to the charge 2, for example by means of a hoop 27 fixed to a ring or hook 28 projecting externally from the end wall of the housing of the charge 2.

[0046] If the casing 1 houses two or more charges, the chamber 8 would be of such a size to house the same number of parachutes 26, each one of which would be connected to a charge.

[0047] With the above construction, when the device without the cap 23 is launched, either by hand or with a firearm, the striker 19 acts on the piston 20, causing ignition of the cord 16, which ignites the combustible mixture of the charge or charges 2. The gases produced at the start of combustion fill the chambers 8 and 25 until sufficient pressure is achieved for the cover 3 to be detached and the charge 2 expelled outside the casing 1. At this point, opening of the parachute 26 will take place, and this will slow the fall of said charge, keeping it in the air long enough to increase its effect.

[0048] The grenades or devices which exist on the market present major problems when it comes to withstanding changes in temperature, humidity, and contact with water. Owing to these circumstances, the grenades or devices lose their effectiveness and in most cases cease to function.

[0049] The construction of the device of the invention makes it possible to withstand climatic changes and the effects thereof, and also temperature variations between -15 and +60°. In addition, if the devices of the invention are immersed in water for more than two hours their correct operational conditions will not be adversely affected, thanks to the arrangement of the cap which protects and seals the head of the device.

[0050] This difference is very important, compared to known grenades or devices, the latter sustaining damage when immersed in water and, on occasion, simply by being in contact with atmospheric humidity, their operating conditions being adversely affected. In the device of the invention, the combustible disks offer secure operation owing to their composition and their protection, even in the event of the device falling into water.

[0051] Lastly, it should be borne in mind that the composition of the combustible disks may be modified, compared to traditional charges existing on the market, as may be the time of emission of the gas produced.

Claims

1. A device with combustible charge with smoke-gen-

erating, tear-generating or signaling effects, which comprises a casing housing a series of charges (2) of combustible, smoke-generating, tear-generating or signaling mixture, which have a coaxial passage (15) through which an ignition cord (16) passes, which casing is closed by a detachable cover (3) which delimits an internal chamber and carries a fuse (18) whose activation gives rise to ignition of the cord and thereby the ignition of the charges, **characterised in that**, between the combustible charges and the end wall (6) of the casing, there is a spacer (7) which defines a chamber between said end wall and the closest charge, in which chamber, and also in the chamber delimited by the cover, once combustion of the charges has been initiated, the combustion gases are progressively stored until sufficient pressure is achieved to cause detachment of the cover and expulsion of the charges outside the casing.

2. A device according to claim 1, **characterised in that** the cover of the casing is coupled in a tight-fitting manner inside said casing and is externally held on by means of crimping of the wall of the casing on the cover, the wall or skirt of said cover resting on the combustible charges in order to push them against said spacer.

3. A device according to claim 1, **characterised in that** the spacer (7') consists of a cylindrical wall, close to the wall of the casing, which delimits a space housing one or more parachutes (26), as many as there are combustible charges (2) housed in the casing, each one of said parachutes being connected to the housing of one of the combustible charges.

4. A device according to claim 3, **characterised in that** the casing houses a single combustible charge (2) and the space defined by the cylindrical wall houses a single parachute (26), the casing of said charge having, from the outer surface of said end wall, a ring (27-28) to which the parachute is connected.

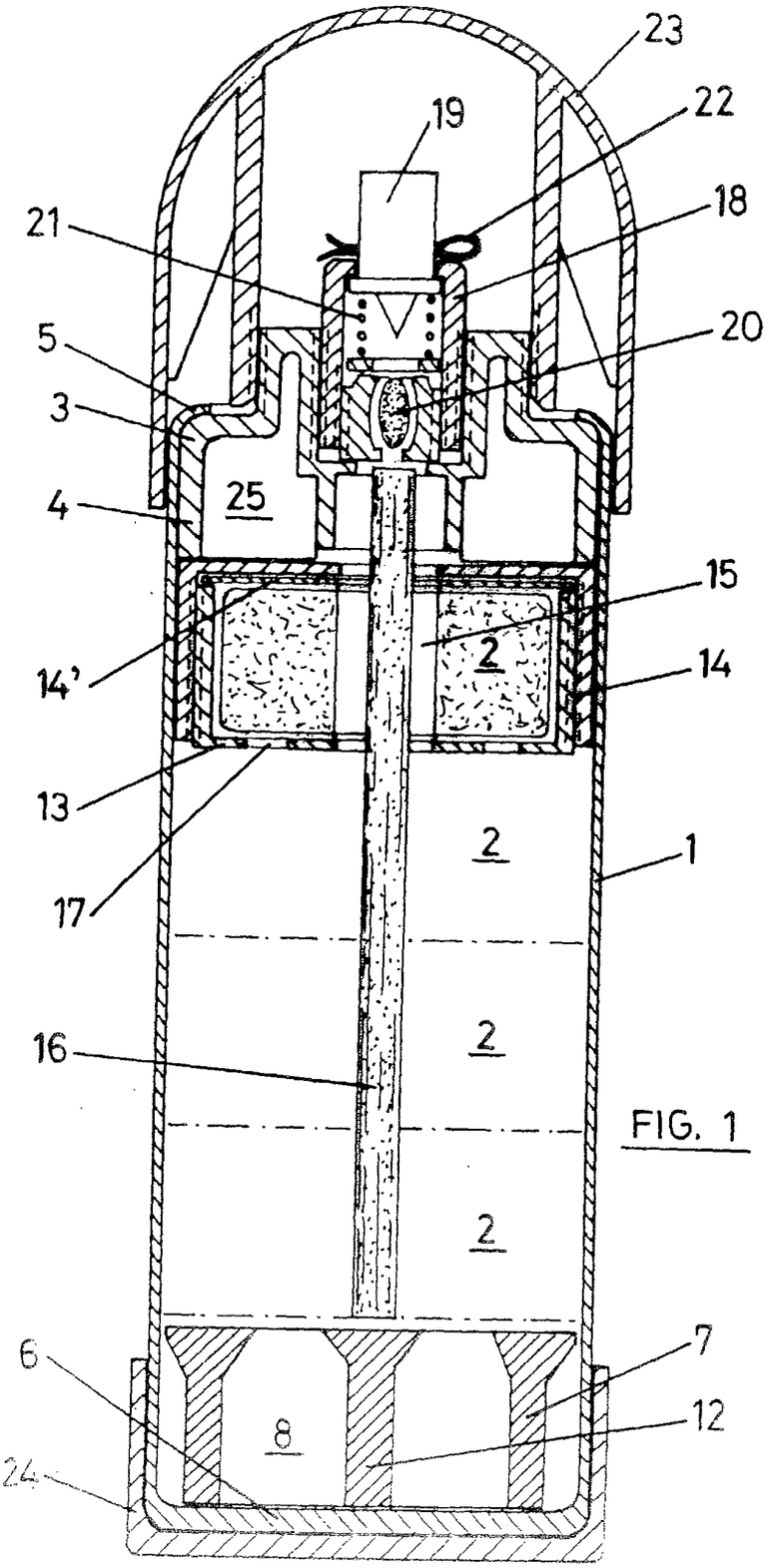

FIG. 1

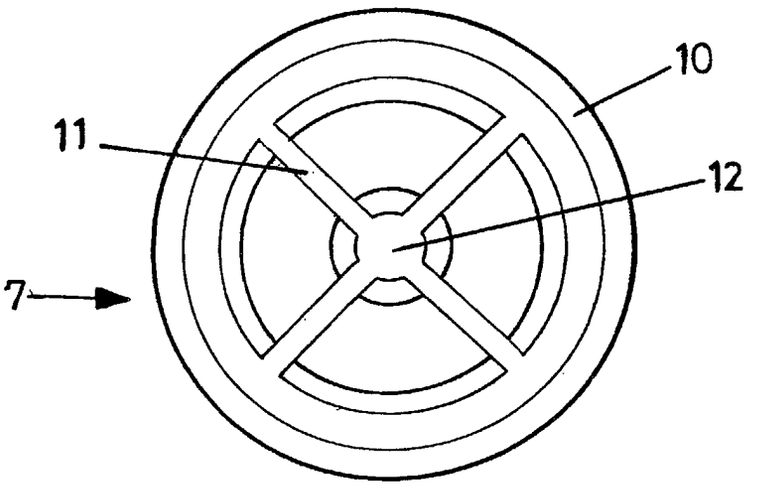

FIG. 2

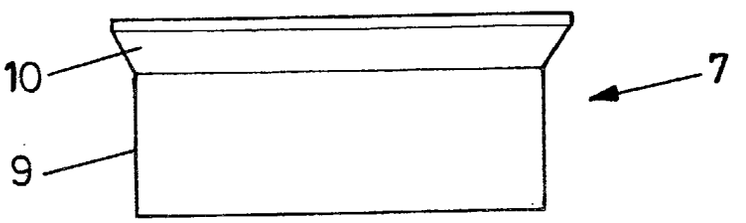

FIG. 3

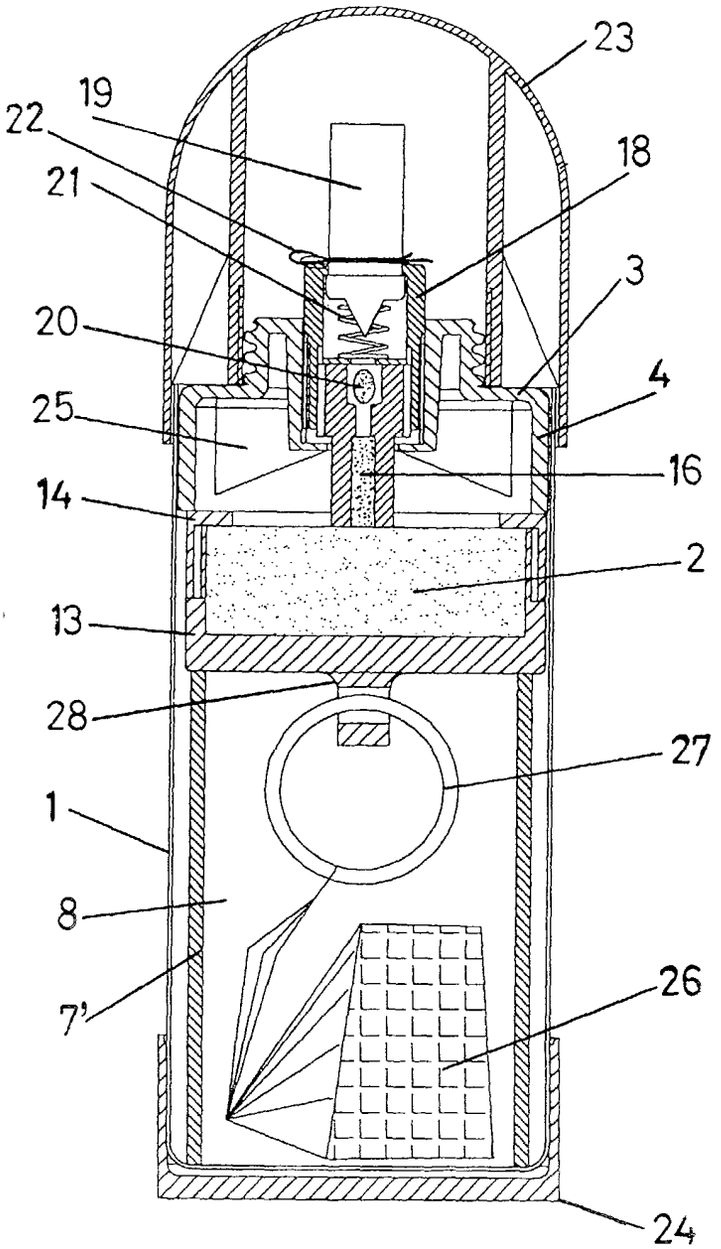

FIG. 4