

[54] PROJECTILE CARRIED IGNITABLE
DEVICE HAVING DELAYED, LARGE
SURFACE IGNITION

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[57] ABSTRACT

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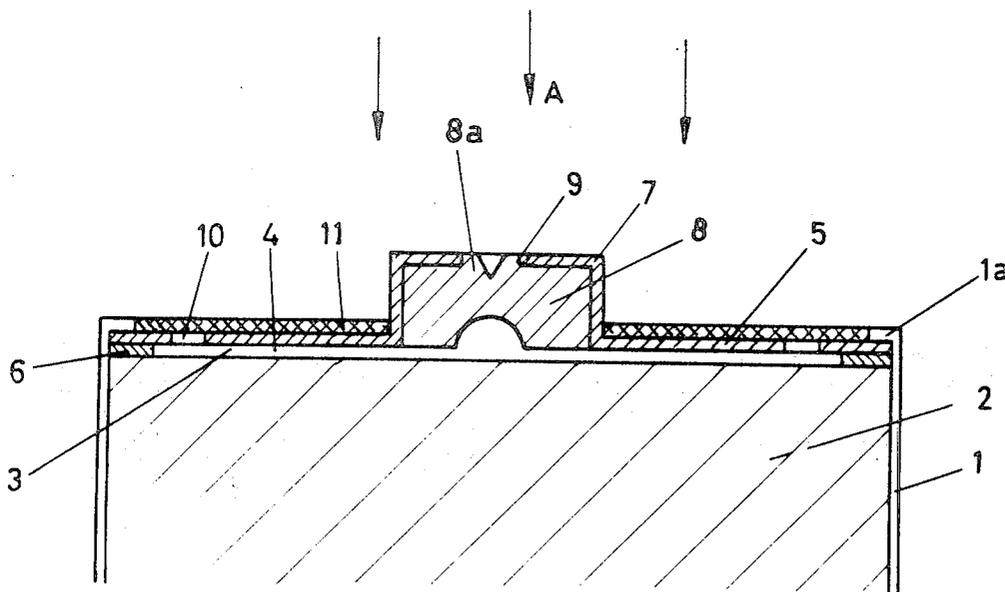
[58] Field of Search..... 102/37.6, 34.4, 35.6,
102/49.5

The main charge of a flare is delayed from being ignited, due to hot gases directed toward a surface of said main charge, by a member covering said surface. The covering member defines a plurality of flare outlet openings communicating with a gap formed between said covering member and said flare surface, and also defines a cavity containing a priming charge, or a priming charge and a delayed charge, exposed for ignition by said hot gases and operative, after a time delay, to ignite the flare over a large surface area via said gap. A further member temporarily covers said plurality of flare outlet openings, said further member being removed to expose said outlet openings upon sudden deceleration of the flare, or due to hot gases produced by ignition of said flare surface.

[56] References Cited
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8 Claims, 2 Drawing Figures



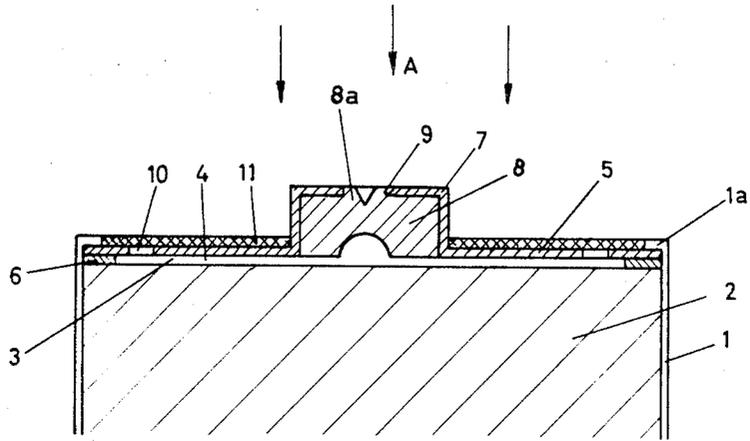


Fig.1

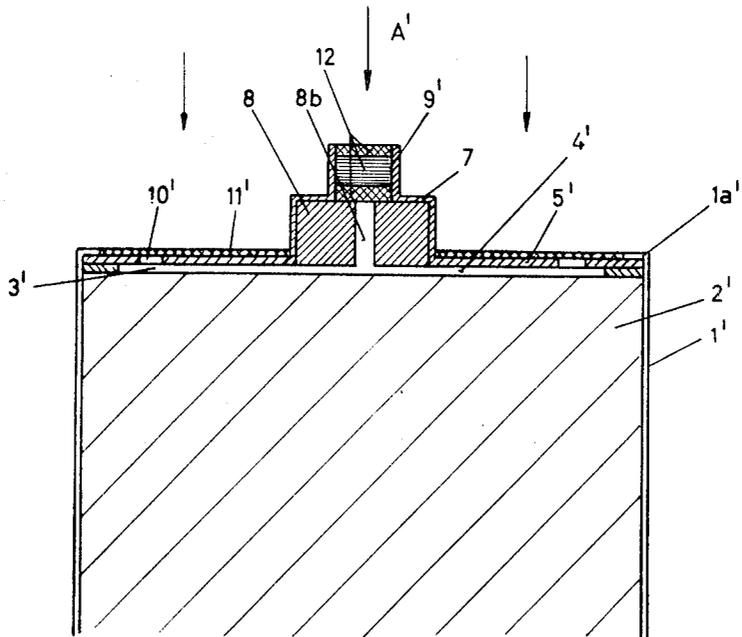


Fig.2

PROJECTILE CARRIED IGNITABLE DEVICE HAVING DELAYED, LARGE SURFACE IGNITION

BACKGROUND OF THE INVENTION

The present invention relates to a device for use in conjunction with a priming charge in a carrier part in the form of a projectile, rocket or the like, which causes the priming charge to ignite a main charge belonging to the carrier part over a relatively large surface momentarily, and which comprises a member covering said surface via a gap-formed space. The covering member has an opening leading to said space, and containing the priming charge, and said member, also defines one or several outlet openings leading from said space, the priming charge being ignited by the hot gases directed towards said openings.

Devices of this kind are utilized, inter alia, for illuminating shells which have a pyrotechnical flare carried in a parachute enclosed within a projectile. This flare, together with the parachute, form part of a unit that can be expelled from the projectile, from which the flare is separated after the unit has been braked down with a brake parachute and a rotation brake. In connection with the separation of the flare from the unit, by means of hot gases, ignition of the flare takes place over one of its end surfaces, which then corresponds to the above-mentioned surface, which ignition takes place by means of the device according to the Swedish Pat. No. 197,826.

As will be noted from said Swedish patent, ignition of the surface in question of flare takes place instantaneously, as a result, in projectiles of the above-mentioned kind, fire damage can occur in the parachute, which is made of inflammable material, since the parachute does not have time to open quickly enough, and is too near the flare when the ignition takes place. The parachute damage due to this burning has often been so extensive that the flare has not been capable of fulfilling its purpose satisfactorily.

SUMMARY OF THE INVENTION

The present invention, which is a further development of the invention described in the aforementioned Swedish patent, is primarily intended to solve these problems. The feature that can mainly be considered to characterize a device according to the present invention is that it has a means for delaying the initiation of the priming charge, appropriately in the form of a delay charge applied to the priming charge and/or that the priming charge is arranged to ignite the main charge only after a certain time has passed, and that it is also provided with a part covering said outlet openings, which part prevents the hot gases from igniting the main charge via the outlet openings.

BRIEF DESCRIPTION OF THE DRAWINGS

Embodiments of the invention will now be described, with reference to the attached drawing, in which

FIG. 1, in a vertical view, shows a first embodiment of the device applied to a flare (main charge)

FIG. 2, in a vertical view, shows a second embodiment of the device applied to flare.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

In FIG. 1, the reference designation 2 shows a flare enclosed in a casing 1, which flare has an end surface

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The purpose of the covering part 11 is to prevent ignition of the flare 2 directed toward opening 10, from the rear by hot gases, the direction of which gases is indicated with arrows A. The hot gases come from an expelling charge not shown, which expels a container also not shown, which at an earlier stage of the functioning of the device had enclosed the flare from the protruding part 7 and along the envelope surface of the casing 1. Said hot gases, instead of impinging on flare surface 3 via openings 10, ignite the priming charge 8 via the opening 9 leading to the gap-formed space 4. The priming charge 8, at its two opposite end surfaces which face the direction from which the hot gases come and said surface 3, respectively, is provided with two recesses located opposite each other via an intermediate layer 8a. After the initiation of the priming charge from the hot gases, when said layer 8a has been burned through, the priming charge, through its formed hole, will produce a flame which is spread over the surface 3 towards the outlet openings 10. The covering disc 11 is then arranged in such a way that, in order to uncover the outlet openings 10, it falls off due to the sudden braking of the flare achieved by the parachute when this is opened. It is advisable, as shown in FIG. 1, to make the protruding part 7 with sloping sides, so that the part 11 can easily be separated from the flare. When the covering part 11 has been removed, the device itself will function in a previously known way.

FIG. 2 shows an alternative embodiment, in which the protruding part 7' is designed so that, in addition to the priming charge 8', it can contain a delay charge 12, which is then fitted in said opening 9. The delay charge is of a conventional kind used in applications such as these, and comprises an ignition composition, a delay pellet and a relay pellet (see the different sectioning in the figure). In this embodiment, the priming charge 8', as in the case of hitherto known devices, has a through hole 8b. Consequently, the hot gases will first ignite the delay charge 12, which, after a certain time during which it burns through, will ignite the priming charge 8' which, as described above, achieves the flame for igniting the surface 3 of the main charge 2'.

In the examples shown, when the flare is carried in a parachute, and in order that the parachute shall have time to open, it has proved to be advisable to delay the

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ignition of the main charge by between 0.2 and 1.0 secs., and particularly suitable values have been between 0.3 and 0.6 secs. The device according to the invention is, of course, not limited to said values, but these can be chosen at will, within very wide limits.

The invention is not limited to the embodiments shown above as examples, but can be subject to modifications within the scope of the following claims. Thus, the invention is not limited to the type of pyrotechnical illuminating projectiles shown, nor to pyrotechnical flares, but can also be utilized in other cases when, for some reason or other, there is a desire to obtain a delay of the momentary ignition. The covering part 11, 11' need not consist of a disc, but can consist of e.g. a thin layer of suitable material applied to the covering member 5, which layer can be destroyed by the hot gases without the main charge being ignited. The covering part 11, 11' can also be arranged to resist gases coming from the directions A, A' on the outside, but to give way when subjected to gases which come from the space 4, 4'.

I claim:

1. In an ignitable unit comprising a main charge adapted to be mounted within a projectile and adapted to be expelled from said projectile by hot gases generated by an expelling charge in said projectile and directed toward a surface of said main charge, the improvement wherein delay means are provided for preventing ignition of said expelled main charge by said hot gases for a predetermined time interval, said delay means including a first cover member covering said main charge surface, said first cover member being disposed in spaced relation to said surface to define a gap between said first cover member and surface and having at least one outlet opening extending through said first cover member in communication with said gap, a removable second cover member adjacent said first cover member in overlying relation to said outlet opening for temporarily covering said outlet opening thereby to prevent said main charge from being ignited by said hot gases via said outer opening, said second cover member being adapted to be removed after said main charge has been expelled, a further opening in said first cover member, and a further charge in said further opening, said further charge having one portion thereof exposed via said further opening to said hot gases for ignition thereby and having an opposing portion disposed adjacent said gap, whereby said further charge, after ignition and burning for a predetermined

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time interval, produces a flame which spreads from said further opening through said gap over the surface of said main charge toward said outlet opening to ignite said main charge over a large surface area thereof.

2. The structure of claim 1 wherein said unit comprises a pyrotechnic device adapted to be expelled, along with an associated parachute, from said projectile, said predetermined time interval being sufficiently long to permit said parachute to open before said main charge is ignited thereby to prevent burning of said parachute by said ignited main charge, said second cover member being mounted for removal in response to deceleration of said main charge upon opening of said parachute.

3. The structure of claim 1 wherein said further charge comprises a priming charge having a first recess in one surface thereof at said one portion of said charge, a second recess in a second surface thereof at said opposing portion of said charge, and a solid charge layer between said first and second recesses adapted, upon ignition of said one portion, to be burned through from said first recess to said second recess to produce a through hole in said priming charge which communicates with said gap.

4. The structure of claim 1 wherein said further charge comprises a solid delay charge having a portion thereof exposed through said further opening to said hot gases, and a priming charge disposed between said delay charge and said gap, said priming charge having a through hole extending from said delay charge to said gap.

5. The structure of claim 1 wherein said first cover member is provided with a plurality of outlet openings spaced from one another in a circular locus, said second cover member comprising a removable disc overlying all of said outlet openings on the side of said first cover member remote from said gap.

6. The structure of claim 5 wherein said further opening is disposed adjacent the center of said circular locus, said removable disc comprising an annulus surrounding said further opening, said first cover member including a portion protruding through the center of said annulus in a direction away from said gap to define a cavity for reception of said further charge.

7. The structure of claim 1 wherein said predetermined time interval is between 0.2 and 1.0 seconds.

8. The structure of claim 1 wherein said predetermined time interval is between 0.3 and 0.6 seconds.

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