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(54) Common carrier muntion

(57) The invention relates to a common carrier munition ammunition device, more particularly to common carrier payload delivery shell.

There is provided a common carrier munition comprising a tail unit (2) , a main body (5) which comprises a payload cavity for receiving a payload, a fuze, and located between said main body and the fuze an ogive element (7), wherein the tail unit and main body comprise cooperatively engaging male (13) and female (14) threaded portions, wherein at least one of the threads is a shearable thread.

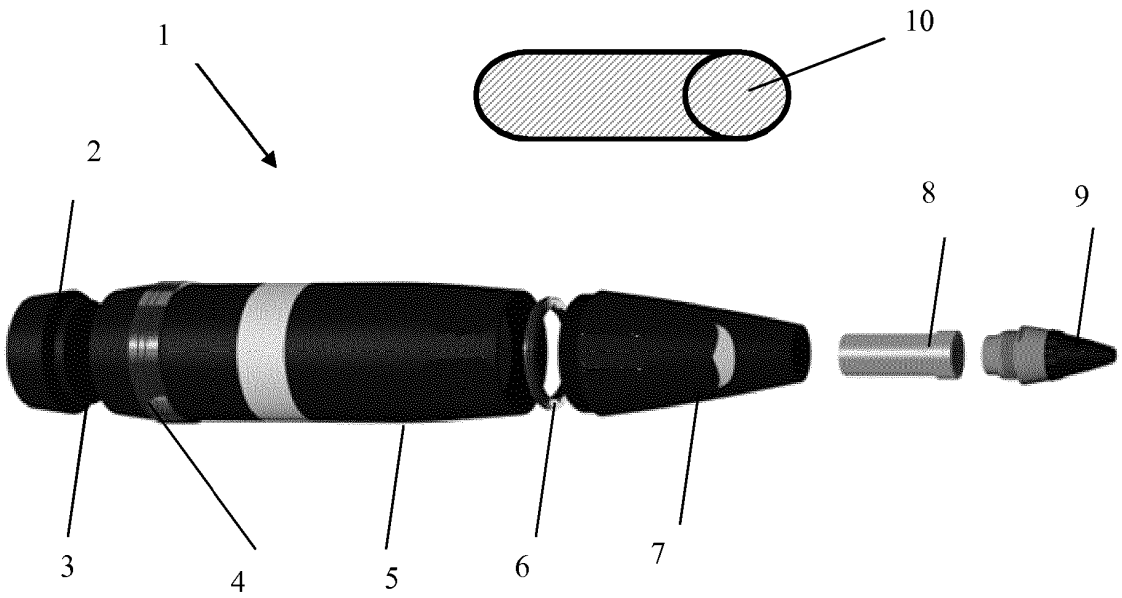

Fig 1

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Description

[0001] The invention relates to a common carrier munition device, more particularly to common carrier payload delivery shell.

[0002] There are many types of munitions that are deployed from ordnance during engagement, with a variety of payloads including high explosives, illumination, smokes, decoys, UAVs etc.

[0003] According to a first aspect of the invention there is provided a common carrier munition comprising a tail unit, a main body which comprises a payload cavity for receiving a payload, a fuze, and located between said main body and the fuze an ogive element, wherein the tail unit and main body comprise cooperatively engaging male and female threaded portions, wherein at least one of the threads is a shearable thread.

[0004] The shearable thread allows the payload to be reversibly loaded from the aft of the main body. Prior art shells are fitted with shearable pins, which irreversibly secure the tail unit to the main body, such that once the munition is constructed the tail unit may only be removed by action of the device or by applying substantial force, to cause shearing of the pins. The use of a shearable thread allows the tail unit to be readily fitted and removed without damaging the shearable linkage. It is therefore possible to remove the payload for routine disposal.

[0005] The main body threaded portion may be manufactured from a first material, and the tail unit threaded portion may be manufactured from second material, wherein the second material has a lower hardness value than the first material, such that upon an applied force, such as, for example the pressure of the gas generated from the expulsion charge, the lower hardness material readily undergoes plastic deformation such that the tail unit disengages from the main body.

[0006] In a highly preferred arrangement the first material is selected from a steel alloy and the second material is selected from aluminium or alloy thereof. For gun launched munitions, such as for examples shells, the forces experienced during launch will place the shell under uniform compression, however the initiation of the expulsion charge, via action of the fuze, will cause the internal cavity of the shell and hence the force on the payload, to place the tail unit under a tensile load, forcing said tail unit and steel body in opposing directions.

[0007] The payload may be inserted into the payload cavity from the aft end of the munition. The payload may be slidably engaged with the payload cavity, such as for example it may have an engineering fit with payload cavity, such that the payload may be prevented from moving within the in a direction which is normal to the elongate axis of the munition. The payload cavity may have substantially parallel walls, which extend from the intersection of main body and tail unit up to a locking ring. To prevent movement of the payload within the cavity along the elongate axis of the munition, the locking ring may be located between the main body and said ogive element, to retain said payload within the payload cavity and prevent movement. Preferably the locking ring and main body comprise cooperatively engaging threaded portions, to allow reversible locking engagement. This allows the locking ring to compensate for any tolerances in manufacture of the payload, and to ensure that the payload is retained in position.

[0008] The payload may be any commonly used payload such as, for example high explosives, illumination, smokes, decoys, chaff or a UAV. The payload and payload cavity are selected such that they are preferably of a uniform dimension, such that any payload may be readily inserted into the uniform payload cavity of the munition. In a preferred arrangement the payload is a modular unit. This allows flexibility on logistics, such that any payload may be inserted into any available carrier munition or shell. Conventional smoke and illumination payloads have bespoke shells or munitions and there is no interchangeability between munitions.

[0009] In a preferred arrangement the payload is reversibly loadable from the aft end of the main body. The provision of a threaded tail unit allows the payload to be loaded and removed from the aft end. In a highly preferred arrangement during use the payload is capable of being dispensed rearwardly from the main body, upon shearing the shearable thread.

[0010] The ogive element is a portion of the munition, typically shell body, and may be reversibly engaged with the fuze and main body.

[0011] The ogive element may have a forward end locatable with said fuze and an aft end locatable with said main body, wherein the internal diameter of the aft end of said ogive element may be substantially the same as the internal diameter of said payload cavity.

[0012] The fuze may be operably connected to an explosive train, to provide an energetic output, such as an expulsion charge or detonative output. Where the payload is delivered during flight i.e. rather than a terminal effect, the payload may be expelled from the munition by an expulsion charge. In preferred arrangement said expulsion charge is suspended in free space within the ogive element, such that it does not physically contact the payload; this allows for minor errors in manufacturing tolerances between the expulsion charge and the payload. The fuze device may comprise safety and arming units (SAU), explosive trains to provide sufficient stimuli to the expulsion charge.

[0013] The fuze may be any known fuze, such as those that respond to selected input or stimuli or a combination of inputs, such as, for example, mechanical actions of the projectile, such as the action of high g forces from gun launch or high spin rates from imparted spin, timed delay, either mechanical or pyrotechnic, caused by separation from the launch system, or proximity to a target. The fuze may function due to electronic activation, such as, for example, from an input from a sensor or detector from on-board said munition or external to the munition. On-board systems may be internal guidance systems.

External stimuli may be provided such as, for example, by fly-by wire, remote control, GPS or target activated laser guidance.

[0014] According to a further aspect of the invention there is provided a method of dispensing a payload from a munition defined herein, comprising the steps of causing initiation of the expulsion charge, and causing shearing of the shearable thread.

[0015] According to a further aspect of the invention there is provided a common carrier shell comprising a uniform payload cavity for receiving a uniform payload, wherein said payload may be selected from a smoke, illumination or UAV payload.

[0016] Whilst the invention has been described above, it extends to any inventive combination of the features set out above, or in the following description, drawings or claims.

[0017] Exemplary embodiments of the device in accordance with the invention will now be described with reference to the accompanying drawings in which:-

Figures 1 show an exploded side view of a shell according to the invention.

Figure 2 shows a cross section along the axis of the shell in figure 1.

[0018] Turning to figure 1 there is provided a shell 1, with a main body 5, which is manufactured from a steel alloy. Located around the circumference of the main body 5 is a copper driving band 4, which allows engagement with the rifling on the bore of a barrel, so as to impart spin. A tail unit 2 is located at the aft of the main body 5. The tail unit 2 is made from aluminium and contains a male threaded portion 3, which engages with a reciprocal female threaded portion (not shown) located in the aft of the main body 5. The payload 10 (shown external to the shell 1), when located in the payload cavity (not shown), inside the main body, is retained in place by use of a locking ring 6, which screws into the forward end of main body 5. The ogive element 7 is removable and is fastened to the locking ring 6. The ogive element receives the expulsion charge 8 and fuze 9. Upon operation of the fuze 9, the expulsion charge 8 builds up pressure within the ogive element and at the bursting pressure the thread 3 shears and the payload 10 is expelled from the aft of the main body 5. The payload 10 is of uniform dimension may be deliver a smoke, illumination, UAV etc output.

[0019] Figure 2 shows an illumination shell 20, with a main body 24 formed from a steel alloy, with a driving band 26 located thereupon. A tail unit 12 is located at the aft of the main body 24. The tail unit 12 is made from aluminium and contains a male threaded portion 13, which engages with a reciprocal female threaded portion 14 located at the aft of the main body 24.

[0020] The payload 22 is located in the payload cavity 15, and is retained in place by use of a locking ring 16, which screws into the forward end of main body 24.

[0021] The ogive element 17 is removable and is fastened to the locking ring 16. The ogive element receives the expulsion charge 18 and fuze 19. Upon operation of the fuze 19, the expulsion charge 18 builds up pressure within the ogive element and at the bursting pressure the thread 13 shears and the payload 22 is expelled from the aft of the main body 24.

[0022] The payload 22, is a modular illumination unit, which slides into the payload cavity 15. The illumination unit contains a parachute bay 27 which houses a parachute (not shown) and an energetic material bay 26, which houses an energetic material 26a.

[0023] Upon operation of the fuze 19, the expulsion charge 18 builds up pressure within the ogive element 17 and at the bursting pressure the thread 13 shears and the payload 22 is expelled from the aft of the main body 24. The expulsion charge may cause a delay composition 11 to ignite the energetic material 25.

Claims

1. A common carrier munition comprising a tail unit, a main body which comprises a payload cavity for receiving a payload, a fuze, and located between said main body and the fuze an ogive element, wherein the tail unit and main body comprise cooperatively engaging male and female threaded portions, wherein at least one of the threads is a shearable thread.

2. A munition according to claim 1, wherein the main body comprises a threaded portion manufactured from a first material, and the tail unit comprises a threaded portion manufactured from second material, wherein the second material has a lower hardness value than the first material.

3. A munition according to claim 2, wherein the first material is selected from a steel alloy and the second material is selected from aluminium or alloy thereof.

4. A munition according to any one of the preceding claims, wherein there is a locking ring located between the main body and said ogive element, to retain said payload within the payload cavity.

5. A munition according to claim 4, wherein the locking ring and main body comprise cooperatively engaging threaded portions.

6. A munition according to any one of the preceding claims, wherein the ogive element is reversibly engaged with the fuze and main body.

7. A munition according to any one of the preceding claims, wherein the ogive element has a forward end locatable with said fuze and an aft end locatable with

said main body, wherein the internal diameter of the aft end of said ogive element is substantially the same as the internal diameter of said payload cavity.

8. A munition according to any one of the preceding claims wherein the fuze is operably connected to at least one expulsion charge, wherein said charge is suspended in free space.

9. A munition according to any one of the preceding claims wherein the payload cavity has substantially parallel walls, which extend from the intersection of the tail unit to the locking ring.

10. A munition according to any one of the preceding claims wherein the payload is a modular unit.

11. A munition according to claim 10, wherein the modular unit, is reversibly loadable from the aft end of the main body.

12. A munition according to any one of the preceding claims wherein the payload is capable of being dispensed rearwardly from the main body, upon shearing the shearable thread.

13. A method of dispensing a payload from a munition according to any one of the preceding claims, comprising the steps of causing initiation of the expulsion charge, causing shearing of the shearable thread.

14. A common carrier shell comprising a uniform payload cavity for receiving a uniform payload, wherein said payload is selected from a smoke, illumination or UAV payload.

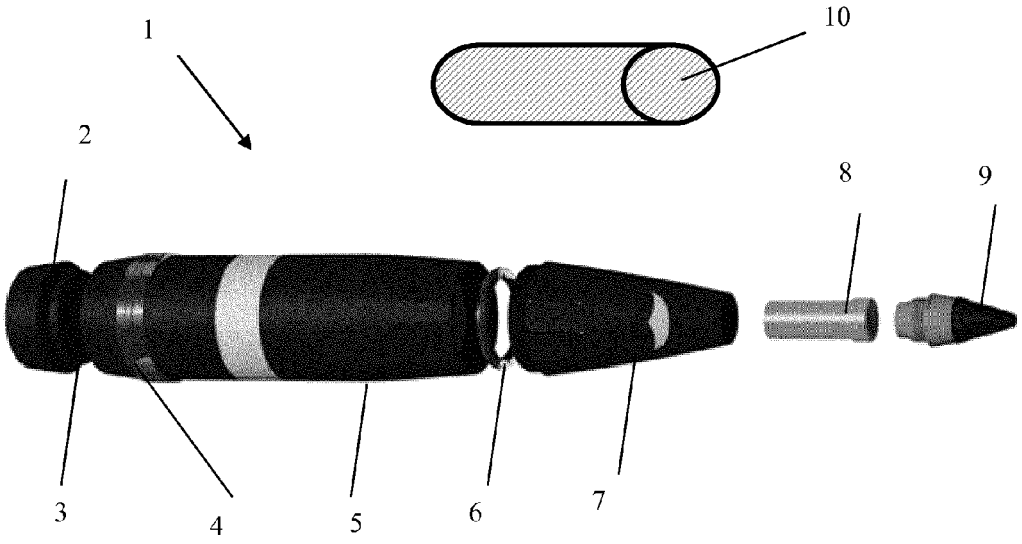

Fig 1

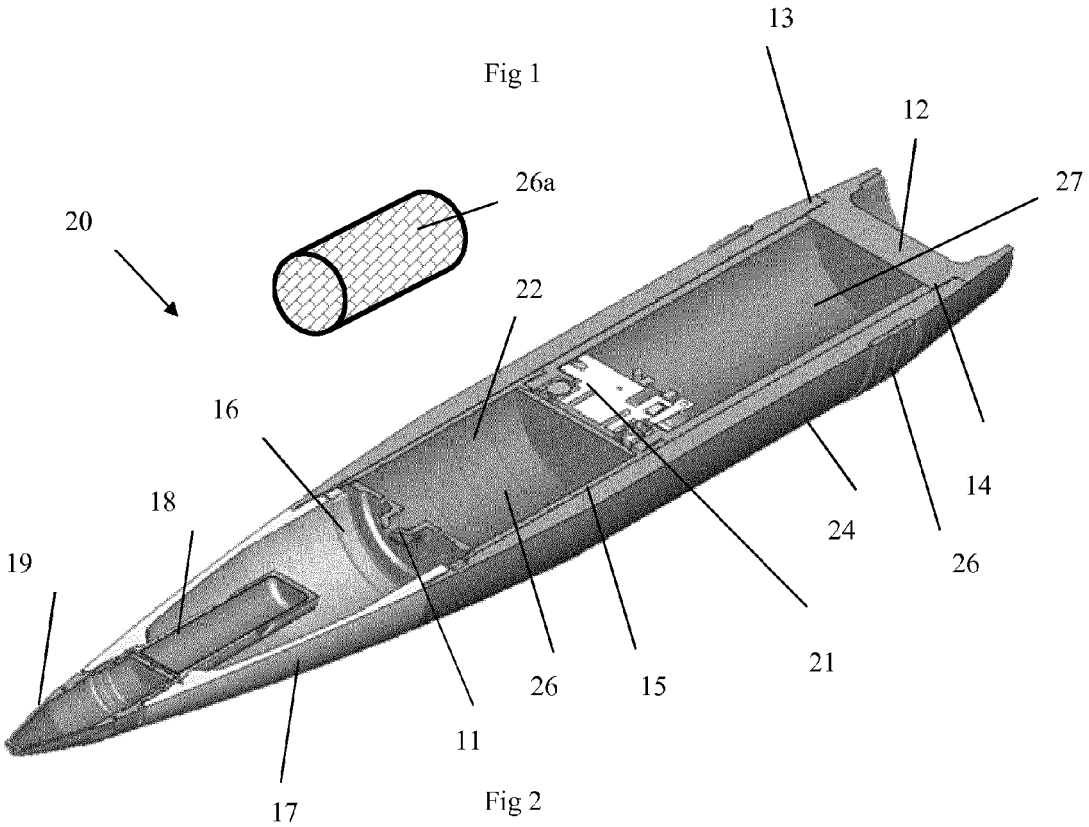

Fig 2

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EUROPEAN SEARCH REPORT

Application Number
EP 13 27 5188

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X Y	GB 143 281 A (LOUIS BOURGUIGNON) 27 May 1920 (1920-05-27) * page 1, line 10 - line 26 * * figures *	1,7-14 2-4	INV. F42B12/62
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X Y	US 7 360 489 B1 (HAN SEUNGEUK [US] ET AL) 22 April 2008 (2008-04-22) * column 3, line 19 - line 30 * * figures *	14 4	
X	US 2012/044710 A1 (JONES KENNETH R [US]) 23 February 2012 (2012-02-23) * abstract *	14	TECHNICAL FIELDS SEARCHED (IPC) F42B
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	27 January 2014	Vermander, Wim

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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A : technological background
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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 13 27 5188

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