Summary

The invention that is the subject of the Patent Application meets the aforesaid need to minimize the safety hazards posed by rocket armaments that can be carried and launched by an individual soldier and improve their effective launch.

In an aspect, the present disclosure refers to a rocket-based armament launchable from a tubular launcher that comprises -

an effective payload;

a rocket motor that is structurally connected to the effective payload and is adapted from the time of ignition of the rocket motor to propel the effective payload; and

a pyrotechnic assembly that has been adapted, once actuated, to eject the rocket motor and said effective payload from said tubular launcher and to ignite said rocket motor;

wherein said armament is characterized in that said armament also comprises:

a. a gas dispersion assembly which, when said rocket armament is not encased in the tubular launcher, prevents the ignition of said rocket motor even if said pyrotechnic assembly is actuated, said dispersion assembly comprising:

a dispersing openings array that is connected to flow of gas mass produced by the actuation of said pyrotechnic assembly, and is encaseable by an interior surface of said tubular launcher in a manner that prevents dispersion of gas through the dispersing openings array; and

a bushing member that is formed as a piston, one end of which is located inside an ejection nozzle of said rocket motor, in a manner that prevents the ignition of the rocket motor by the force of the gas mass-produced by the actuation of said pyrotechnic assembly, if said dispersing openings array is not encased, and therefore enables the dispersion of gases through the gas dispersion assembly; and

b. a cutting and separation assembly that is actuated by gas pressure from said rocket motor for mechanically cutting the structural connection between the rocket motor and the effective payload and separate the rocket motor and the effective payload during flight of the armament.

In an aspect, the present disclosure refers to a gas dispersion assembly of a pyrotechnic assembly that can be fitted in a rocket-based armament that is launchable from a tubular launcher, wherein said gas dispersion assembly comprises -

a dispersing openings array that is connected to flow of gas mass-produced by an actuation of said pyrotechnic assembly, and is encaseable by an interior surface of said tubular launcher in a manner that prevents dispersion of gas through the gas dispersion assembly; and

a bushing member that is formed as a piston, one end of which is located inside an ejection nozzle of said rocket motor, in a manner that prevents the ignition of the rocket motor by the force of the gas mass-produced by the actuation of said pyrotechnic assembly, if said dispersing openings array is not encased in the tubular launcher, and therefore enables the dispersion of gases through said array;

wherein the gas dispersion assembly is configured to prevent the ignition of the rocket motor of said armament when the rocket armament is not encased in the tubular launcher, even if said pyrotechnic assembly is actuated.

In an aspect, the present disclosure refers to a cutting and separation assembly, comprising:

a cutting piston located at an end of a rocket motor of a rocket armament and stressed on a side of the cutting piston by gas pressure that forms from an ignition of said rocket motor to a linear motion towards a structural connection between the rocket motor and an effective payload of the rocket armament to mechanically cut the structural connection;

a springy means that rests on said structural connection and stresses said cutting piston on another side of the cutting piston opposite said linear motion, and once the structural connection is cut, the cutting and separation assembly helps to thrust said rocket motor and separate the rocket motor from the effective payload;

a dispersing openings array that is connected to a flow of gas and is encaseable by an interior surface of a tubular launcher; and

a bushing member that is formed as a piston, one end of which is located inside an ejection nozzle of said rocket motor, in a manner that prevents the ignition of the rocket motor by the flow of gas if the dispersing openings array is not encased;

wherein the cutting and separation assembly is actuated by gas pressure from the rocket motor to mechanically cut the structural connection between the rocket motor and the effective payload and separate the rocket.

Examples are directed to a rocket armament launchable from a tubular launcher that comprises an effective payload, a rocket motor that is structurally connected to the effective payload and adapted, once ignited, for propelling the effective payload towards the target, and a pyrotechnic assembly that has been adapted, once actuated, to eject the rocket motor and the effective payload from the tubular launcher and ignite the rocket motor. A rocket armament, which according to an example is characterized in that the armament also comprises -

a. A gas dispersion assembly, which when the rocket armament is not contained in the tubular launcher, secures non-ignition of the rocket motor even if the pyrotechnic assembly is actuated; and

b. A cutting and separation assembly that is activated by the pressure of the rocket motor gases for mechanically cutting the structural connection between the rocket motor and the effective payload and separate them during flight.

According to another example the invention that is the subject of the Patent Application is embodied in a gas dispersion assembly of a pyrotechnic assembly that can be installed in a rocket armament launchable from a tubular launcher from the time of actuation of the pyrotechnic assembly. The gas dispersion assembly prevents the ignition of the armament's rocket motor as long as the armament is not contained in a tube and despite the actuation of the pyrotechnic assembly.

According to another example the invention that is the subject of the Patent Application is embodied in a cutting and separation assembly, which is actuated by gas pressure of the armament's rocket motor in order to mechanically cut the structural connection between the armament's rocket motor and the effective payload and their separation during the flight of the armament.

According to another example the invention that is the subject of the Patent Application is embodied in a method to prevent ignition of an armament's rocket motor that is launchable from a tubular launcher, even in the event of actuation of the pyrotechnic assembly that normally serves to eject the armament from the launcher and ignite the rocket motor.

According to another example the invention that is the subject of the Patent Application is embodied in a method that is applicable in a rocket-based armament for mechanically cutting the structural connection between the rocket motor and the effective payload and their separation from each another.

Another example of the disclosure provides a gas dispersion assembly of a pyrotechnic assembly that can be fitted in a rocket-based armament that is launchable from a tubular launcher, from the time of actuation of the pyrotechnic assembly, in order to prevent the ignition of the rocket motor of said armament when it is not encased in a tube and notwithstanding the actuation of said pyrotechnic assembly. The gas dispersion assembly comprises a dispersing openings array that is connected to the flow of gas mass produced by the actuation of said pyrotechnic assembly, and is encaseable by the interior surface of said tubular launcher in a manner that prevents the dispersion of gas through it and a bushing member that is formed as a sort of piston, one end of which is located inside the ejection nozzle of said rocket motor, in a manner that prevents the ignition of the motor by the force of the gas mass produced by the actuation of said pyrotechnic assembly, if said dispersing openings array is not encased as stated, and therefore enables the dispersion of gases through said array.

Another example of the disclosure provides a cutting and separation assembly which is actuated by gas pressure of armament's rocket motor in order to mechanically cut the structural connection between the armament's rocket motor and the armament's effective payload and their separation during the flight of the armament. The cutting and separation assembly comprises a cutting piston located at the end of said rocket motor and is stressed on the one side from the force of the gas pressure that forms from the action of said rocket motor, to a linear motion towards said structural connection between the rocket motor and the effective payload, and to mechanically cut the connection and a springy means that rests on said structural connection and stresses said cutting piston on its other side against said linear motion, and once the mechanical cutting is completed, it helps to thrust said rocket motor and separate it from the effective payload.

Another example of the disclosure provides a method to prevent the ignition of a rocket armament launchable from a tubular launcher, even in the event of actuation of the pyrotechnic assembly, which normally serves to eject the armament from the launcher and to ignite the rocket motor. The method comprises providing and locating a dispersing openings array that is connected to the flow of gases produced by the actuation of the pyrotechnic

assembly, while diverting the gases from the rocket motor and preventing its resulting ignition and encasement of said dispersing openings array by an encasement member, in a manner that routes the gases formed from the actuation of the pyrotechnic assembly to the rocket motor, as required for its ignition.

Another example of the disclosure provides a method applicable in a rocket-based armament for mechanical cutting the structural connection between the rocket motor and the effective payload and separating them from each other. The method comprises setting a cutting piston into linear motion by the pressure of the gases produced from the combustion of the rocket motor's propellant towards the structural connection between the rocket motor and the effective payload, exertion of shearing force by means of said cutting piston on the structural connection and separating it by cutting it and separation of the rocket motor from the effective payload once the cutting is completed.

Still other aspects, embodiments, and advantages of these exemplary aspects and embodiment are discussed in detail below. Embodiments disclosed herein may be combined with other embodiments in any manner consistent with at least one of the principles disclosed herein, and references to "an embodiment," "some embodiments," "an alternate embodiment," "various embodiments," "one embodiment" or the like are not necessarily mutually exclusive and are intended to indicate that a particular feature, structure, or characteristic described may be included in at least one embodiment. The appearances of such terms herein are not necessarily all referring to the same embodiment.

CLAIMS

1. A rocket-based armament launchable from a tubular launcher that comprises -

an effective payload;

a rocket motor that is structurally connected to the effective payload and is adapted from the time of ignition of the rocket motor to propel the effective payload; and

a pyrotechnic assembly that has been adapted, once actuated, to eject the rocket motor and said effective payload from said tubular launcher and to ignite said rocket motor;

wherein said armament is characterized in that said armament also comprises:

a. a gas dispersion assembly which, when said rocket armament is not encased in the tubular launcher, prevents the ignition of said rocket motor even if said pyrotechnic assembly is actuated, said dispersion assembly comprising:

a dispersing openings array that is connected to flow of gas mass produced by the actuation of said pyrotechnic assembly, and is encaseable by an interior surface of said tubular launcher in a manner that prevents dispersion of gas through the dispersing openings array; and

a bushing member that is formed as a piston, one end of which is located inside an ejection nozzle of said rocket motor, in a manner that prevents the ignition of the rocket motor by the force of the gas mass-produced by the actuation of said pyrotechnic assembly, if said dispersing openings array is not encased, and therefore enables the dispersion of gases through the gas dispersion assembly; and

b. a cutting and separation assembly that is actuated by gas pressure from said rocket motor for mechanically cutting the structural connection between the rocket motor and the effective payload and separate the rocket motor and the effective payload during flight of the armament.

2. The rocket armament of claim 1, wherein said cutting and separation assembly comprises-

a cutting piston located at an end of said rocket motor and is stressed on a side of the cutting piston by gas pressure that is formed by the ignition of said rocket motor in a

linear motion towards said structural connection between the rocket motor and the effective payload to mechanically cut the structural connection; and

a springy means that rests on said structural connection and stresses said cutting piston on another side of the cutting piston opposite the linear motion of the cutting piston, and once the structural connection is cut, the cutting and separation assembly helps to thrust said rocket motor and separate the rocket motor from the effective payload.

3. The rocket armament of claim 1, wherein said armament is a 40mm armament that is launchable from said tubular launcher, the tubular launcher being a grenade launcher or a single-use disposable canister.

4. A gas dispersion assembly of a pyrotechnic assembly that can be fitted in a rocket-based armament that is launchable from a tubular launcher, wherein said gas dispersion assembly comprises -

a dispersing openings array that is connected to flow of gas mass-produced by an actuation of said pyrotechnic assembly, and is encaseable by an interior surface of said tubular launcher in a manner that prevents dispersion of gas through the gas dispersion assembly; and

a bushing member that is formed as a piston, one end of which is located inside an ejection nozzle of said rocket motor, in a manner that prevents the ignition of the rocket motor by the force of the gas mass-produced by the actuation of said pyrotechnic assembly, if said dispersing openings array is not encased in the tubular launcher, and therefore enables the dispersion of gases through said array;

wherein the gas dispersion assembly is configured to prevent the ignition of the rocket motor of said armament when the rocket armament is not encased in the tubular launcher, even if said pyrotechnic assembly is actuated.

5. A cutting and separation assembly, comprising:

a cutting piston located at an end of a rocket motor of a rocket armament and stressed on a side of the cutting piston by gas pressure that forms from an ignition of said rocket motor to a linear motion towards a structural connection between the rocket motor and an effective payload of the rocket armament to mechanically cut the structural connection;

a springy means that rests on said structural connection and stresses said cutting piston on another side of the cutting piston opposite said linear motion, and once the structural connection is cut, the cutting and separation assembly helps to thrust said rocket motor and separate the rocket motor from the effective payload;

a dispersing openings array that is connected to a flow of gas and is encaseable by an interior surface of a tubular launcher; and

a bushing member that is formed as a piston, one end of which is located inside an ejection nozzle of said rocket motor, in a manner that prevents the ignition of the rocket motor by the flow of gas if the dispersing openings array is not encased;

wherein the cutting and separation assembly is actuated by gas pressure from the rocket motor to mechanically cut the structural connection between the rocket motor and the effective payload and separate the rocket.