April 5, 1966 J. R. MILLS ETAL 3,244,104

MISSILE SEPARATING DEVICE

Filed March 25, 1964

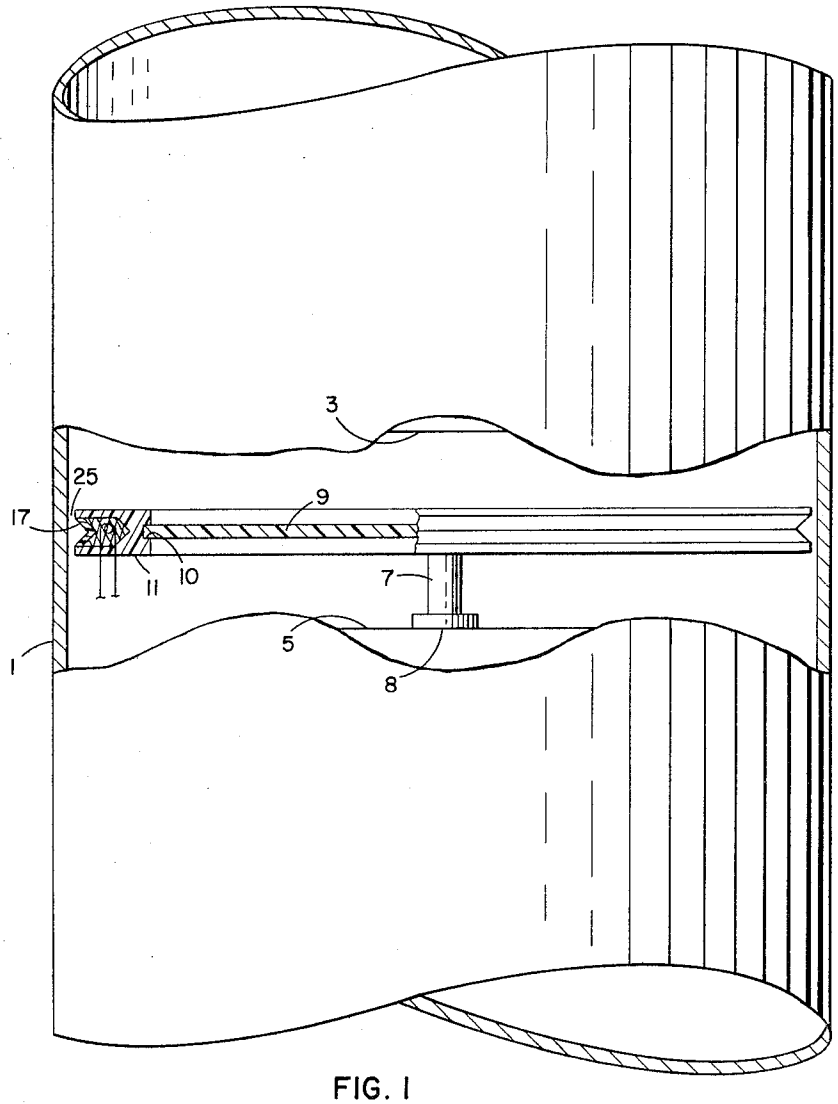


FIG. 1

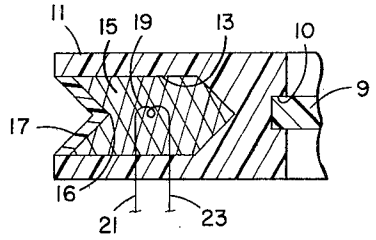


FIG. 2

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United States Patent Office 3,244,104 Patented Apr. 5, 1966

3,244,104

MISSILE SEPARATING DEVICE

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Filed Mar. 25, 1964, Ser. No. 354,805
2 Claims. (Cl. 102—49)

The invention described herein may be manufactured and used by or for the Government for governmental purposes without the payment of any royalty thereon.

This invention relates to a missile separating device in which a shaped explosive charge is used to separate a missile into two stages.

Missile separating devices in use today consist of explosive bolt devices and a device known as Primacord that is used to sever the stages of a missile which are connected by thin body structure. Each of the above devices requires special mounting means, and that the explosive devices be mounted directly within a portion of the missile body structure. Since these explosive devices are mounted in direct contact with the body structure, they are subjected to the heat conducted through the body structure, thereby creating the danger of premature separation due to the possibility of the heat igniting the explosive devices.

In view of the above enumerated facts, there is a need for an explosive separating means that is simple, that requires a minimum amount of support, that will sever thick and heavy body structures, and that can be insulated from the heat conducted thru the missile body structure. The missile separating device disclosed herein is designed to accomplish the need set forth supra.

Therefore, it is an object of this invention to provide a shaped explosive charge which is mounted inside a one piece missile body structure between two missile motors, and is adapted to sever the body structure into two portions, thereby forming two missile stages.

Another object of this invention is to provide a shaped charge device which is capable of severing heavy and thick body structures.

A further object of this invention is to provide a device which requires minimum support structure for the explosive shaped charge.

Still another object of this invention is to provide an explosive device which is not in direct contact with the body structure which is to be separated, but rather is insulated by an insulating space between the explosive charge and the body structure.

Yet another object of this invention is to provide an explosive device which requires only a minimum amount of support, thereby allowing the support structure for the explosive to be made from insulating material.

In accordance with the invention, a new and improved missile separating device is provided, that includes a shaped explosive charge designed for mounting inside the missile body structure with an insulating space between the explosive charge and the missile body structure. Detonation of the explosive charge creates a radiating jet which cuts and severs the missile body structure into two sections.

In the accompanying drawing forming a part of this specification, and in which like numerals are employed to designate corresponding parts throughout the same:

FIGURE 1 is a sectional view, partially cutaway, of the missile separating device and

FIGURE 2 is a sectional view showing details of the shaped charge means on an enlarged scale.

The invention may be better understood by referring to the drawing wherein, numeral **1** designates, for example, a one piece missile body which has motors **3** and **5** mounted therein. An attachment means **7** is connected

in a conventional manner at one end **8** to a portion of motor **5** and at the other end to a flat support disk **9**. This flat support disk **9** is connected at its outer periphery to a support ring **11** by means including groove **10** in the inner surface of support ring **11**. Support ring **11** also contains a circumferential groove **13**, in its outer periphery, which has a V-shaped bottom. A shaped charge **15** is contained in groove **13**, and a V-shaped liner **17** seals off groove **13** to contain charge **15** therein. A conventional electrical igniter **19**, having conductors **21**, **23** is used to ignite explosive charge **15** in a conventional manner.

The shaped charge **15** is in the form of a fine ring, that is a ring which is relatively small in comparison to an equivalent non-shaped explosive ring, and has a radial cross section with the same shape as the axial cross section of the conical shaped charges used in warheads. The explosive ring is so shaped as to have its power concentrated circumferentially at position **16**, and the power from the explosive ring comes forth as heat and as a blast at position **16** concentrated radially outwardly.

Support ring **11** is so mounted in body **1** as to provide an insulating or standoff space **25** between the body and ring. This space serves to insulate shaped charge **15** from heat conducted through body **1**. The supporting structure for the shaped charge, such as any or all of members **7**, **9**, **11** and **17**, may be made of thermal insulating material to further insulate the shaped charge from heat conducted through the body and motors.

In operation, when it is desired to sever stage **3** from stage **5**, shaped charge **15** is ignited by electrical igniter **19**. Upon detonation of shaped charge **15**, a jet is generated which projects radially outwardly from the periphery of ring **11**, cuts, and severs the missile body **1** to thus separate the missile into two stages. After the body has been cut into two stages, the stages may be moved apart by any conventional means for this purpose, such as by the release of some spring means (not shown) or by the setting off of some additional explosive separating means (not shown).

It is to be understood that the form of our invention, herewith shown and described, is to be taken as a preferred example only, and that various changes in the size, shape and arrangement of parts may be resorted to, without departing from the spirit of our invention or the scope of the sub-joined claims.

We claim:

1. A missile separating device comprising: a missile body having inner and outer surfaces; and an explosive separator means mounted in said missile body, said separator means including a support ring with a groove in the outer periphery thereof, said groove being V-shaped at the bottom thereof, a shaped charge completely received in said groove and conforming to the shape of said groove, a V-shaped liner member sealing said groove to contain the shaped charge therein, said support ring having an inner periphery with a disc member secured to said inner periphery, an elongated support member connected at one end centrally of said disc and at the other end to missile supporting structure to mount said explosive separator means in said missile body, the outer periphery of said support ring being spaced from the inner surface of said missile body to define an insulating air space therebetween, and said support ring, said disc member and said elongated support member being made of thermal insulating material.

2. The combination comprising: a missile body having inner and outer surfaces; at least two motors mounted in spaced relation within said missile body; and an explosive separator means mounted in said missile body and between said motors, said explosive separator means in-

cluding, a ring shaped support having an inner and outer periphery, said outer periphery having a peripheral shaped charge groove therein that is V-shaped at the bottom thereof, a shaped charge in said groove, a liner mounted on said support so as to seal said groove and contain said shaped charge therein, said liner being V-shaped in a corresponding direction to that of said bottom, means connected to a portion of one of said motors and to said support, mounting said support between said motors, said mounting means including a disk mounted in said inner periphery and an elongated support member connected at one end to said disk near the center thereof and at the other end to said one of said motors, and said mounting means, said support and said liner being made of thermal insulating material so as to insulate said charge from heat conducted through said missile body and said one of said motors.

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