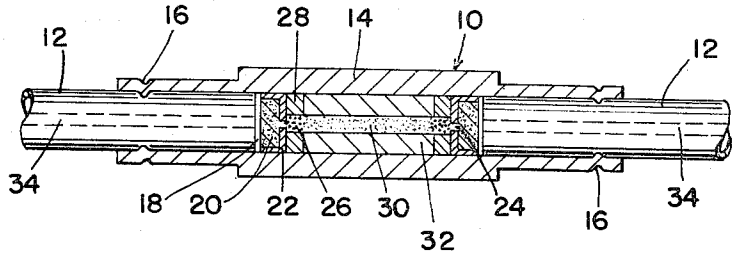
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PYROTECHNIC DELAY DEVICE FOR MILD DETONATING FUZE

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PYROTECHNIC DELAY DEVICE FOR MILD DETONATING FUZE

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ABSTRACT OF THE DISCLOSURE

A relay element including a case open at either end for insertion of two ends of mild detonating fuze. Included in the remaining portion of said case is a lead tube which houses a delay column. Adjacent each end of said delay column is a vented washer containing a gasless igniter mixture. Adjacent the aforesaid washer is a second vented washer containing a primary explosive composition which is separated from the ends of the mild detonating fuze by a paper disc.

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

The present invention relates to a pyrotechnic delay device for mild detonating fuze and more particularly to a pyrotechnic delay device for introducing delay times of several seconds into mild detonating fuze lines.

A device of this type is used mainly in aircraft emergency escape systems. Such systems employ a mild detonating fuze, referred to hereinafter as MDF, as the energy transfer medium between cartridge activated devices. The sequencing of various functions in the escape system, i.e. canopy removal, seat ejection, etc. are such that delays in time are required between successive functions.

The nature of the invention is such that it can be fitted between two MDF segments, causing a selected time delay upon system initiation. Environmental conditions, i.e. temperature, pressure, humidity, chemical reaction, etc. dictate that the delay composition be completely sealed from the environment. The invention satisfies this condition in that the delay train and adjacent explosives are completely surrounded by the body of the invention before, during and even after firing.

Previous delays of this type as described in U.S. Patent No. 2,736,263 function only with common detonating cord or Cordeau fuze, do not remain intact, and only affect delay trains of up to 300 milliseconds.

It is therefore an object of the present invention to provide a pyrotechnic delay device for mild detonating fuze having delay times of up to 15 seconds.

Another object is the provision of a pyrotechnic delay device for mild detonating fuze which is completely sealed from the environment.

The above objects as well as others together with the benefits and advantages of the invention will be apparent upon reference to the detailed description set forth below, particularly when taken in conjunction with the drawing annexed hereto in which is shown a delay element **10** separating a length of mild detonating fuze (MDF) **12**. Said MDF **12** being a waterproofed, braided-fabric covered metallic tubing having a core of high explosive, such as PETN, RDX, or some other suitable composition. Both ends of the MDF **12** are inserted into the case **14** where they are maintained in place by crimps **16** at either

end. Adjacent to both MDF ends **12** are two paper disks **18**, which cover a primary explosive mixture **20**, which could be lead azide or lead styphnate, contained in a washer **22** vented at **24**. A gasless igniter mixture **26**, which could be boron/potassium nitrate, zirconium/lead oxide or zirconium/lead dioxide, is adjacent to the vent **24** in the washer **22**, and is contained in a second washer **28** which rests on either end of a column of any suitable known delay composition **30**. The column of delay composition **30** is housed in a lead tube **32**.

In operation, detonation of the high explosive core **34** in the MDF **12**, proceeds in either direction to the paper disk **18**, where sufficient energy is transferred to the primary explosive mixture **20** to cause detonation of same. Energy from the detonation of the primary explosive is transferred through the vent **24** in washer **22** to the gasless igniter mixture **26**, which is ignited. Heat transfer to the delay composition **30** effects deflagration of the delay column. The reverse sequence of energy transferred from the delay column to the MDF is in the reverse order to that described above.

Obviously many modifications and variations of the present invention are possible in light of the above teachings. It is therefore to be understood, that within the scope of the appended claims, the invention may be practiced otherwise than as specifically described.

We claim:

1. A pyrotechnic delay device for mild detonating fuze including a delay element comprising
- a case open at either end,
- means for securing the ends of said case to the ends of said mild detonation fuze,
- a lead tube contained in said case, containing a column of delay composition,
- a paper disc adjacent to each end of said mild detonating fuze within said case,
- a first vented washer adjacent said paper discs,
- a primary explosive composition contained within said vented washer,
- a second vented washer between said first vented washer and said lead tube, and
- a gasless igniter mixture contained within said second vented washer.

2. A device of the type described in claim **1** wherein said primary explosive composition is lead azide.

3. A device of the type described in claim **1** wherein said primary explosive composition is lead styphnate.

4. A device of the type described in claim **1** wherein said gasless igniter mixture is boron/potassium nitrate.

5. A device of the type described in claim **1** wherein said gasless igniter mixture is zirconium/lead oxide.

6. A device of the type described in claim **1** wherein said gasless igniter mixture is zirconium/lead dioxide.

7. A device of the type described in claim **1** including crimps on each end of said case for securing thereto the ends of said mild detonating fuze.

References Cited

UNITED STATES PATENTS

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