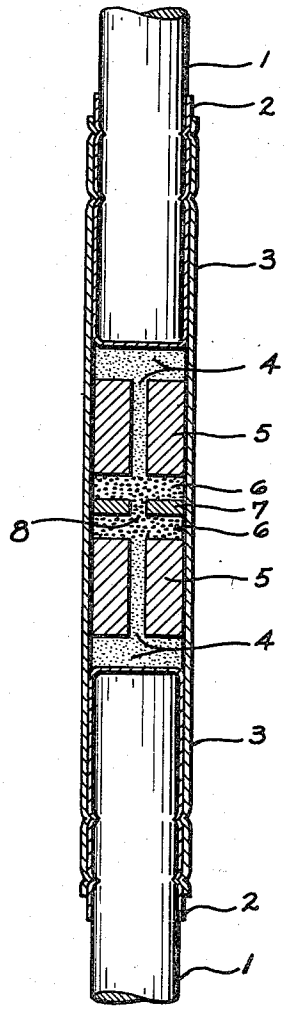
May 3, 1955 W. E. HAMILTON 2,707,439

SHORT INTERVAL DELAY BLASTING DEVICE

Filed May 26, 1954



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United States Patent Office 2,707,439
Patented May 3, 1955

2,707,439

SHORT INTERVAL DELAY BLASTING DEVICE

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Application May 26, 1954, Serial No. 432,546
3 Claims. (Cl. 102—27)

The present invention relates to short interval delay blasting devices and more particularly to short interval delay connectors used to introduce a short interval delay into a train of detonating fuse.

Detonating fuse is well-known as the type of fuse which consists of a high explosive core such as pentaerythritol tetranitrate for example contained within a waterproof sheath overlaid by reinforcing coverings. This fuse has a very high velocity, detonating at approximately 21,000 feet per second. Its explosive force is such that it may be used to detonate high explosives adjacent to it in a borehole or the like.

As in other methods of detonating explosives, short interval delays are desirable with this type of fuse in order to enjoy the benefits of successive shots separated by very short periods of time. This delay has been obtained in the past by using blasting caps to initiate separate lines of detonating fuse, each line being connected to one or more charges of explosives. Delaying the detonation of the successive blasting caps by known methods resulted in the delay being transmitted to the detonating fuse and thus to the separate charges. The complexity inherent in such methods is not desirable in the field.

Devices have been proposed which are designed to be inserted in a length of detonating fuse itself to act as a delay mechanism whereby the progress of the detonation wave along a line of fuse is interrupted for a short, definite and predetermined time interval.

One proposed type employs an air gap within a metallic tube assembly as a delay device. The chance of misfire is relatively high with such a type and two or three must be connected in parallel to assure proper detonation transmission.

Other types of delay devices are uni-directional in that the detonation wave must enter the device at only one end for it to be properly delayed and re-initiated in the remaining detonating fuse. An error in directional orientation while setting up a blast in the field will result in misfire with this type.

It is an object of the present invention to provide an improved short interval delay device for use with detonating fuse.

It is a further object of this invention to provide a waterproof reliable short interval delay device which may be quickly and conveniently attached to two ends of detonating fuse in the field without regard to direction of propagation of the detonation wave.

According to the present invention a short interval delay blasting device adapted to be inserted between two lengths of detonating fuse may be provided which comprises in combination a tubular casing, two impervious receptacles adapted to receive the ends of said lengths of detonating fuse partially encased and supported in a symmetrical opposing relationship by the tubular casing at the ends thereof, two explosive charges abutting the inner closed ends of said receptacles, two metallic elements having a thin axial core of explosive composition, a charge of a highly exothermic gasless burning composition intermediate said metallic elements and surrounding a metallic disc having axial hole said disc being positioned between said metallic elements.

The tubular casing and impervious receptacles are preferably constructed of a copper or aluminum-based alloy while the metallic elements and central disc are preferably of lead.

The explosive abutting the inner ends of the receptacles and filling the axial core of the metallic elements may be any suitable composition having sufficient explosive force to initiate detonating fuse, such as lead azide, for example. The gasless burning composition may be a 70/30 mixture of lead oxide and silicon or any similar suitable composition.

The axial core of the metallic elements is preferably of small diameter, of the order of from 0.020 to 0.080 inch and the axial hole in the central disc is preferably of the same dimension.

The invention will be more readily understood through reference to the accompanying drawing which represents a cut away section lengthwise through a typical delay device embraced by the scope of the present invention.

In the drawing **1** represents the end of a length of detonating fuse held in the cup-shaped receptacle **2** which is in turn held by the tubular casing **3**. **4** represents an explosive charge which extends into the axial core of the metallic element **5**. The gasless burning composition is shown at **6**, surrounding the metallic disc **7** having an axial hole **8**.

The delay interval introduced through the use of such a device may be conveniently controlled by altering the thickness of the central metallic disc and the diameter of the hole in its centre. This disc acts as a baffle, preventing instantaneous blow-through while allowing the burning to progress through the gasless composition.

It is evident that substitutions may be made in the various materials used in the components of these devices without departing from the scope of the invention as defined in the claims.

Having thus described my invention what I claim is:

1. A short interval delay blasting device adapted to be inserted between two lengths of detonating fuse which comprises in combination a tubular casing, two impervious receptacles adapted to receive the ends of said lengths of detonating fuse partially encased and supported in a symmetrical opposing relationship by the tubular casing at the ends thereof, two explosive charges abutting the inner closed ends of said receptacles, two metallic elements having a thin axial core of explosive composition, a charge of a highly exothermic gasless burning composition intermediate said metallic elements and surrounding a metallic disc having an axial hole, said disc being positioned between said metallic elements.

2. A short interval delay blasting device adapted to be inserted between two lengths of detonating fuse which comprises in combination a metallic tubular casing, two metallic cups adapted to receive the ends of said lengths of detonating fuse partially encased and supported in a symmetrical opposing relationship by the tubular casing at the ends thereof, two explosive charges abutting the inner closed ends of said metallic cups, two metallic elements comprised of lead having a thin axial core of explosive composition, a charge of a highly exothermic gasless burning composition intermediate said metallic elements and surrounding a metallic disc having an axial hole, said disc being positioned between said metallic elements.

3. A short interval delay blasting device as claimed in claim 2 wherein the explosive composition is lead azide and the gasless burning composition is a mixture of 70% lead oxide and 30% silicon by weight.

References Cited in the file of this patent

FOREIGN PATENTS

638,974	Great Britain	June 21, 1950
708,422	Great Britain	May 5, 1954