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Sewell et al.

[11] **3,830,156**

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[54] **EXPLOSIVE LINE CUTTING DEVICE**

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[52] **U.S. Cl.** **102/22**

[51] **Int. Cl.** **F42b 3/00,** F42d 3/00

[58] **Field of Search** ..... 102/24 R, 23, 22, 97

[56] **References Cited**

FOREIGN PATENTS OR APPLICATIONS

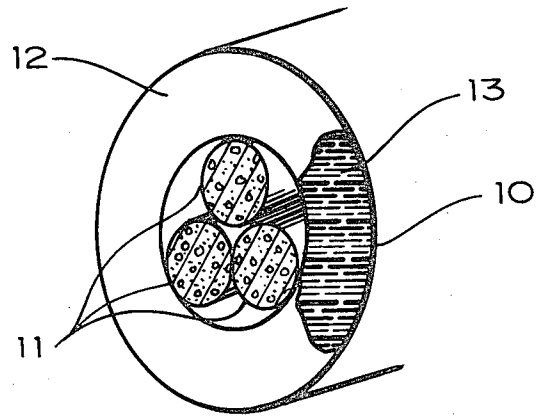
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[57] **ABSTRACT**

An explosive line cutting device and method for clearing a fire trail. It comprises a deformable plastic explosive strand centrally disposed through a plastic tube which is substantially filled with fire-retardant solution. A booster initiator is suitably secured to one end of the explosive strand. Upon detonation of the explosive strand the solution enhances the intensity of the shock wave which clears a trail, reduces the incendiary action of the explosive charge, and at the same time provides a fire retardant effect along the fire line.

3 Claims, 2 Drawing Figures



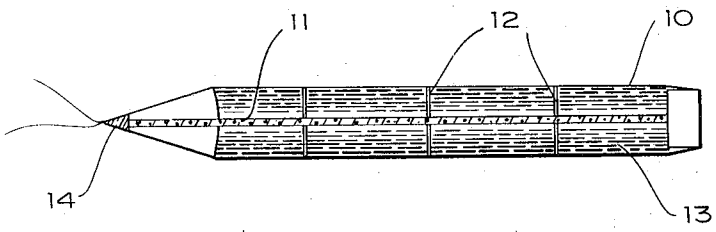


FIG. 1.

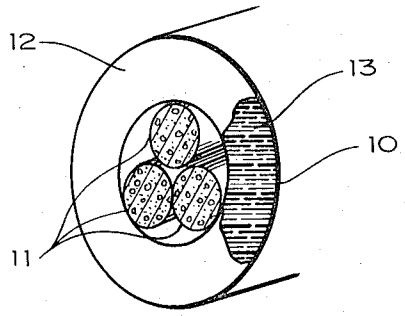


FIG. 2.

EXPLOSIVE LINE CUTTING DEVICE

The invention described herein may be manufactured and used by or for the government of the United States of America for governmental purposes without the payment of any royalties thereon or therefor.

BACKGROUND OF INVENTION

This invention relates to an explosive fire-line cutting device, and cutting method for clearing a fire trail.

Bare explosive charges have been used in clearing or cutting a line in grass, brush, or forest litter. Unfortunately, bare explosives such as a detonating fuse will also ignite forest fuels. The problem of explosive fire-line cutting is closely analogous to the problem of coal mine blasting. Deformable plastic explosive packages are well known having been used to conform to the shape of uneven surfaces or crevices which allows the explosive material to come into more intimate contact with the thing being blasted. These packages are generally sealed to keep water and other contaminants from coming in contact with the explosive charge. Detonation arresters for liquid explosives have been used which precompress an explosive to a density which creates an explosive barrier. Such devices are useful to prevent propagation of the detonation in the event of an accidental explosion. The present invention provides a rapid, safe, and effective means for blast enhancement, particularly useful in clearing fire trails. The device uses less explosive than other devices of this nature and enhances the trail effect by dispersing fire retardant along the trail as it is cleared.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a longitudinal section embodying the principles of the invention; and

FIG. 2 is a cross-sectional view of another embodiment of the invention employing multiple explosive strands.

DESCRIPTION OF THE INVENTION

Referring now to the drawing there is shown in FIG. 1 a flexible length of plastic tubing **10** having disposed through the center thereof at least one strand of plastic explosive **11**. Explosive **11** is held in position in tubing **10** by a plurality of membrane-like supports **12** spaced at predetermined intervals along the inner walls of the tubing. The tubing may be of any suitable reinforced inert elastomeric material as can be the supports. Plexiglass tubing was used in the first devices made and tested herein, and wooden webbing was used for the supports to hold the strand in place. Multiple strands of explosive as shown in FIG. 2 were also used. The space in the tubing surrounding the strand is substantially filled with an aqueous fire-retardant solution designated generally by numeral **13**. The ends of tubing **10** are sealed by crimping or other means to prevent the loss of the solution containing the fire retardant. A booster initiator **14** is positioned at one end of explosive **11** and placed so as to extend beyond the end of tubing **10** for ignition purposes. The explosive strand used was a pentaerythritol tetranitrate (PETN) filled detonating fuse and a diammonium phosphate mixture was the fire retardant. Other deformable explosives reliable and safe in the 400 to 1,200 grain per foot size could be used as could any of the commercial fire retardants, or simply water per se.

In operation the tube containing the explosive core or strand is unreeled and deployed at any desired length and in any desired configuration in the area to be cleared. The solution consisting essentially of fire-retardant and water or just water is pumped into the tube **10** which is closed at both ends. A booster initiator **14** is positioned at one end of explosive strand **11**. Upon detonation of the booster initiator and thereafter the explosive strand, a line is cut through the adjacent vegetation providing quick access to the area. This device in operation normally provides a fireline that is two to three feet in width. The water-fire retardant solution enhances the blast effect and acts to widen the path. The fire-retardant in the solution limits further ignition of the surrounding vegetation.

The present invention provides a device which rapidly and safely clears fire lines of brush and low scrubby growth. The solution surrounding the explosive core provides blast enhancement; less explosive is needed; fewer personnel are needed to deploy and operate the device; and, the retardant limits further ignition of the surrounding growth.

What is claimed is:

1. A rapid fire line cutting device which comprises:

a plastic tube of predetermined size provided with web-like support structure extending from the inner walls toward the center of the tube;

means for sealing the ends of said tube;

at least one deformable explosive strand disposed through the center of the tube and being supported therein by said web-like support;

an aqueous solution surrounding said explosive strand; and

a booster initiator positioned at one end of said strand.

2. The device in accordance with claim **1** wherein the plastic tube is plexiglass and the explosive strand is pentaerythritol tetranitrate.

3. The device in accordance with claim **2** wherein the aqueous solution comprises water and diammonium phosphate.

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