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Picard et al.

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[54] SELF-DESTRUCT LAND MINE

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[52] **U.S. Cl.** **102/8**, 102/6, 102/37, 102/57

[51] **Int. Cl.** **F42b 23/00**

[58] **Field of Search** 102/8, 6, 57, 58, 90, 65, 37; 149/16

[56] **References Cited**

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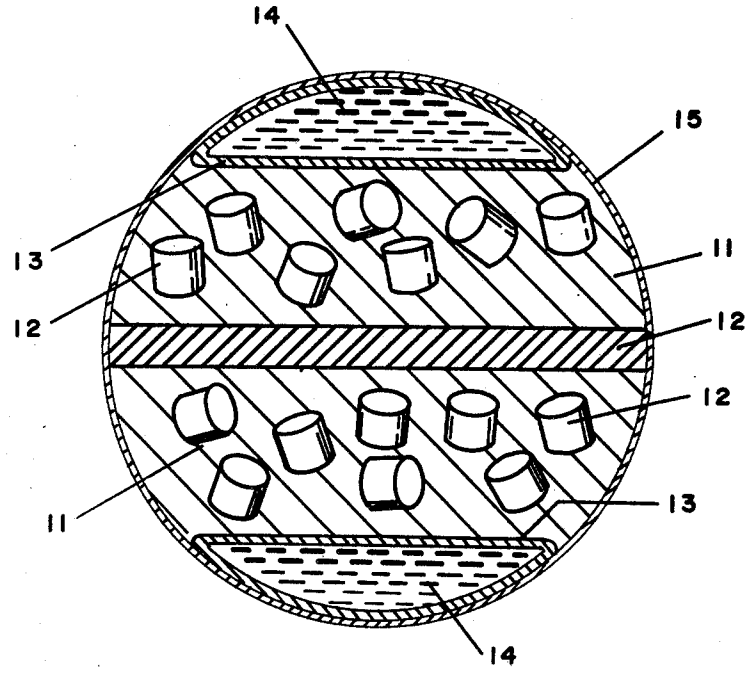
[57] **ABSTRACT**

A land mine capable of self-destructions after a selected period of time which includes a central portion of a friction sensitive material capable of supporting self combustion. A layer of white phosphorus disposed so as to surround and directly contact said friction material and having embedded therein a plurality of explosive pellets. One or more thin wall, frangible, glass vials containing a vaporizable solvent, abutting at least a portion of said white phosphorus and facing outwardly thereof. The entire structure being coated with an elastic material which is soluble under the action of said solvent. There is specifically disclosed the use of acetone in conjunction with a nitrocellulose coating and a generally spherical configuration. The mine being capable of initial activation by pressure applied thereto, which, ignites the frictional material and in turn the phosphorus. The ignited phosphorus detonates the explosive pellets. The self-destruct operation commences when the mine is dropped, as for example, from an airplane, and the glass vial is broken thus releasing the solvent which starts the dissolution of the nitrocellulose outer film. When dissolved the phosphorus is exposed to the atmosphere and self destruction is initiated thus providing in addition, a visual indication of activation and self-destruction.

7 Claims, 2 Drawing Figures



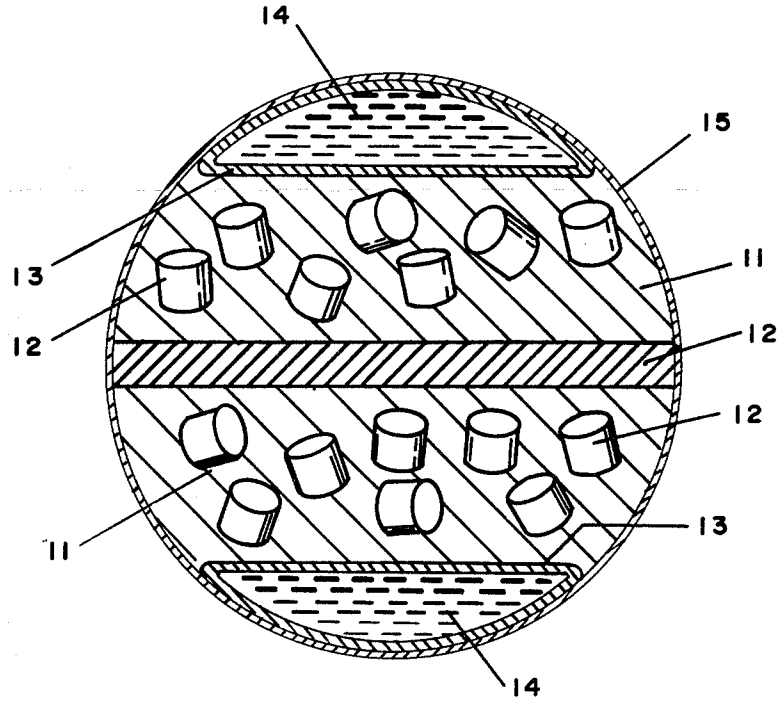


FIG - 1

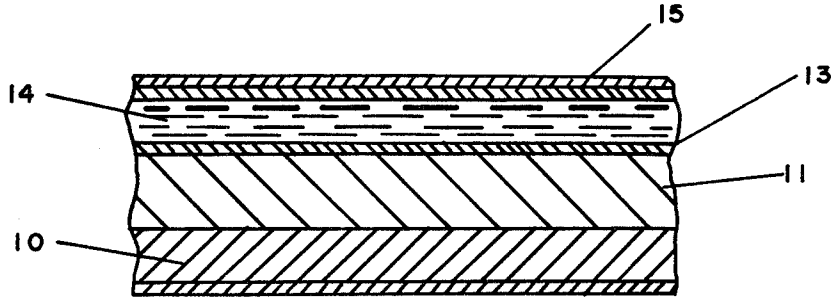


FIG - 2

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SELF-DESTRUCT LAND MINE

BACKGROUND OF THE INVENTION

The present invention relates to land mines and more particularly pertains to a land mine which self-destructs after a specific lapse of time and which may be handled and delivered with a minimum of danger.

DESCRIPTION OF THE PRIOR ART

In the field of land mines, it has been the general practice to employ various devices to self-destruct the mine. These mines when dropped or positioned behind enemy lines are capable of inflicting extensive personnel and vehicular damage. However, should this mined territory be evacuated by the enemy, it is essential that the mines be deactivated or destroyed before the invading force can operate therein.

One attempt to fabricate a self-destruct explosive mine device included the use of an extremely sensitive explosive mixed with a friction producing material. To this mixture was added a solvent for desensitization and the entire resulting mass encased in a membrane permeable to the solvent vapor thus permitting the mine to be sensitized upon the passage of the solvent vapor into the atmosphere. If the device is unactivated for a period of time, the permeable membrane allows the atmosphere to pass into the device. In so doing, the atmospheric vapors condense and wet the mixture thus desensitizing the device. Although the reasons are not evident, it has been found that the process of sensitization and desensitization have not produced reliable results. However, it is known, that when sensitized, the device is extremely sensitive so that preparation handling and local delivery are hazardous endeavors. Additionally, delivery of the mines to an enemy area, usually by an air drop, further increases the associated danger. The present invention overcomes these inherent limitations of the prior art devices and provides a reliable and relatively safe self-destruct land mine.

SUMMARY OF THE INVENTION

The general purpose of this invention is to provide a self-destruct land mine that has all the advantages of similarly employed prior art devices and has none of the above described disadvantages. To attain this, the present invention provides a unique arrangement of combustible materials wherein a central layer of a pressure sensitive friction or match material capable of self-supporting combustion is sandwiched between or surrounded by white phosphorus. Embedded within the phosphorus are a plurality of explosive pellets and disposed adjacent the outward surface of the phosphorus are a plurality of thin walled frangible vials having therein a vaporizable solvent. The entire structure is coated with an elastic film which is soluble by said solvent. The commencement of the self-destruct action involves the shattering of the vials upon impact from air delivery. The released solvent starts dissolution of the coating and when completed therethrough, the white phosphorus is exposed to the atmosphere and the device is in the final stage of destruction.

An object of the present invention is to provide a self-destruct explosive device wherein the sensitization and desensitization are reliable and the device is relatively safe to prepare, handle and deliver.

Another object is to provide a simple, effective, low cost and reliable, pressure activated self-destruct land mine which provides a visible indication of its activation.

Other objects and many of the attendant advantages of this invention will be readily appreciated as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 shows in cross section an embodiment made in accordance with the principle of this invention; and,

FIG. 2 shows in broken-away cross section a basic embodiment of the invention.

BRIEF DESCRIPTION OF A PREFERRED EMBODIMENT

In the illustrated embodiment of FIG. 1, a central core or layer 10 of a friction sensitive material which is capable of supporting its own combustion such as a match composition containing sufficient oxidizer is sandwiched between opposing layers of white phosphorus 11. A friction sensitive material which has been found to provide satisfactory results is a composition of red phosphorus, potassium chlorate and ground glass to which may be added a silicate powder such as Cab-O-Sil or Cuso (tradenames). These powders permit ease of handling in that they maintain stability and lessen the sensitivity of the composition. The white phosphorus when ignited produces billows of smoke as well as an intense flame, thereby providing indications of destruction which can be visually detected during both day and night. Embedded within the white phosphorus are explosive pellets 12 which can be of nitroamines such as, RDX or HMX explosives, which chemically are cyclotetramethylene tetranitramine and cyclotrimethylenetrinitramine.

Disposed adjacent to the outer surface of the white phosphorus are a plurality of thin walled glass vials 13 having contained therein a solvent 14 such as acetone. The entire structure is coated with an elastic film 15 of nitrocellulose which can be dissolved by the solvent. This coating is applied initially as a lacquer and thereafter allowed to dry. Another possible satisfactory coating is cellulose acetate, while other useful solvents are, ethylacetate or ketones. It is of course, essential, that the solvent be proximate the coating which it is to dissolve, subsequent to the shattering of the vial.

The overall operation of the mine may be briefly summarized as follows:

The mines are packaged in egg crate containers submerged in water, in which state, they can be stored as well as transported. Final delivery is generally made by air and the mines dropped in enemy territory. Since the mines are of low mass, a maximum of vial breakage occurs but, with a minimum of friction material ignition. The mines are therefore immediately in a sensitized condition. Activation is effected initially by the application of pressure as by a person or a vehicle tire passing thereover. This application of weight results in compression and, relative displacement of the friction sensitive material so as to cause ignition thereof. In turn, the rapid oxidation of the friction material fires or ignites the adjacent layers of white phosphorus which then detonate the explosive pellets.

In the event the mine is not activated by an outside force, the solvent from the broken vial commences to dissolve the outer film or coating. By varying either or both, the particular solvent and the film thickness the time period necessary for the solvent to expose the white phosphorus may be varied at the user's discretion. Upon exposure of the white phosphorus to the atmosphere, it ignites, and results in the subsequent detonation of the pellets completing the self-destruction. The oxidation of the white phosphorus produces an intense flame and a large volume of smoke, both visible during night and day in addition to the audible explosion. It is quite clear, that except for the function of personnel injury and property damage, the explosive pellets would not be necessary since the mines would still provide an indication of enemy presence through visual indications. Such a basic device is shown in FIG. 2 where only the essential elements are indicated thereon.

It should be understood, of course, that the foregoing disclosure relates to only preferred embodiments of the invention and that numerous modifications or alterations may be made therein without departing from the spirit and the scope of the invention as set forth in the appended claims.

We claim:

1. A self-destructing pyrotechnic device comprising:
a friction sensitive material capable of self-sustained oxidation of sufficient intensity to ignite,
an adjacent quantity of white phosphorus,
a frangible container having disposed therein,
a volatile solvent for,
an elastomeric coating forming a closed surface about the aforesaid components.
whereby said device may be activated by compression and in the absence of such compression and upon breakage of said container, said solvent will dissolve said coating and expose said white phosphorus to the atmosphere thereby initiating destruction.

2. The device according to claim 1 further including explosive pellets disposed within said white phosphorus.

3. The device according to claim 2 wherein said friction sensitive material is a mixture of red phosphorus, potassium chlorate, ground glass and a silicate powder.

4. The device according to claim 3 wherein said solvent is acetone and said coating is a dried nitrocellulose lacquer.

5. The device according to claim 3 wherein said coating is cellulose acetate and said solvent is a ketone.

6. The device according to claim 4 wherein said frangible container is of a thin walled glass.

7. The device according to claim 6 wherein said device is of a generally spherical configuration and said friction sensitive material is sandwiched between two layers of said white phosphorus and said container is disposed outwardly of said layers of white phosphorus.

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