# United States Patent

**Rose et al.**

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## [54] REACTIVE FOCUSING WARHEAD CONCEPT


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[73] Assignee: **The United States of America as represented by the Secretary of the Navy**



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[52] **U.S. Cl.** ..... **102/56,** 102/24 HC

[51] **Int. Cl.** ..... **F42b 1/02**

[58] **Field of Search** ..... 102/24 HC, 56–58



[56] **References Cited**

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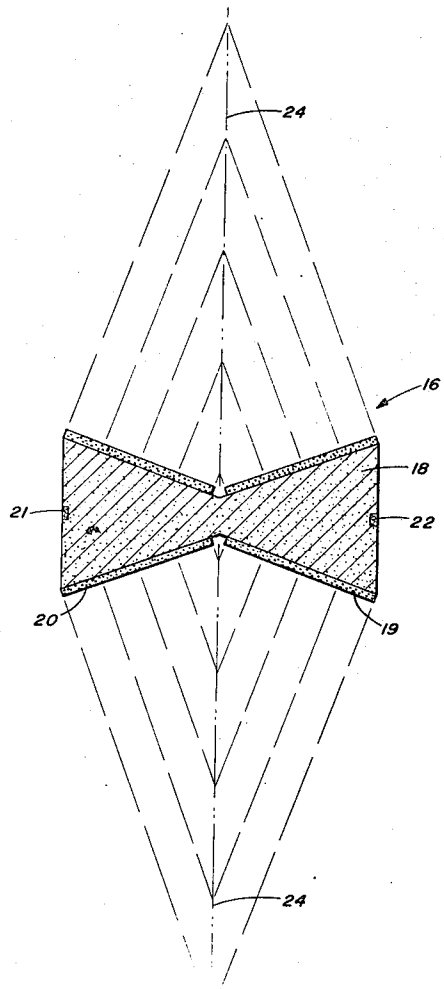
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[57] **ABSTRACT**

A warhead containing two components, each of which is explosively inert alone but which explode when combined. Upon detonation of the warhead the components are propelled along separate paths to a point near the target where they combine and explode to extend the destructive radius of the warhead.


**9 Claims, 2 Drawing Figures**



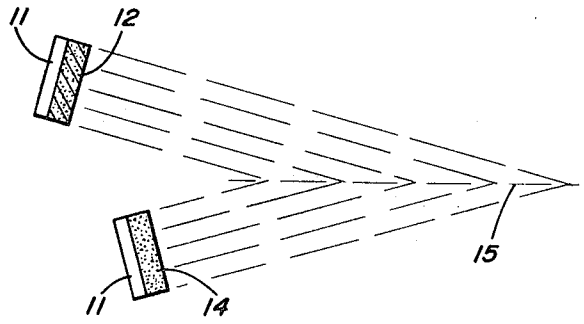



FIG. 1

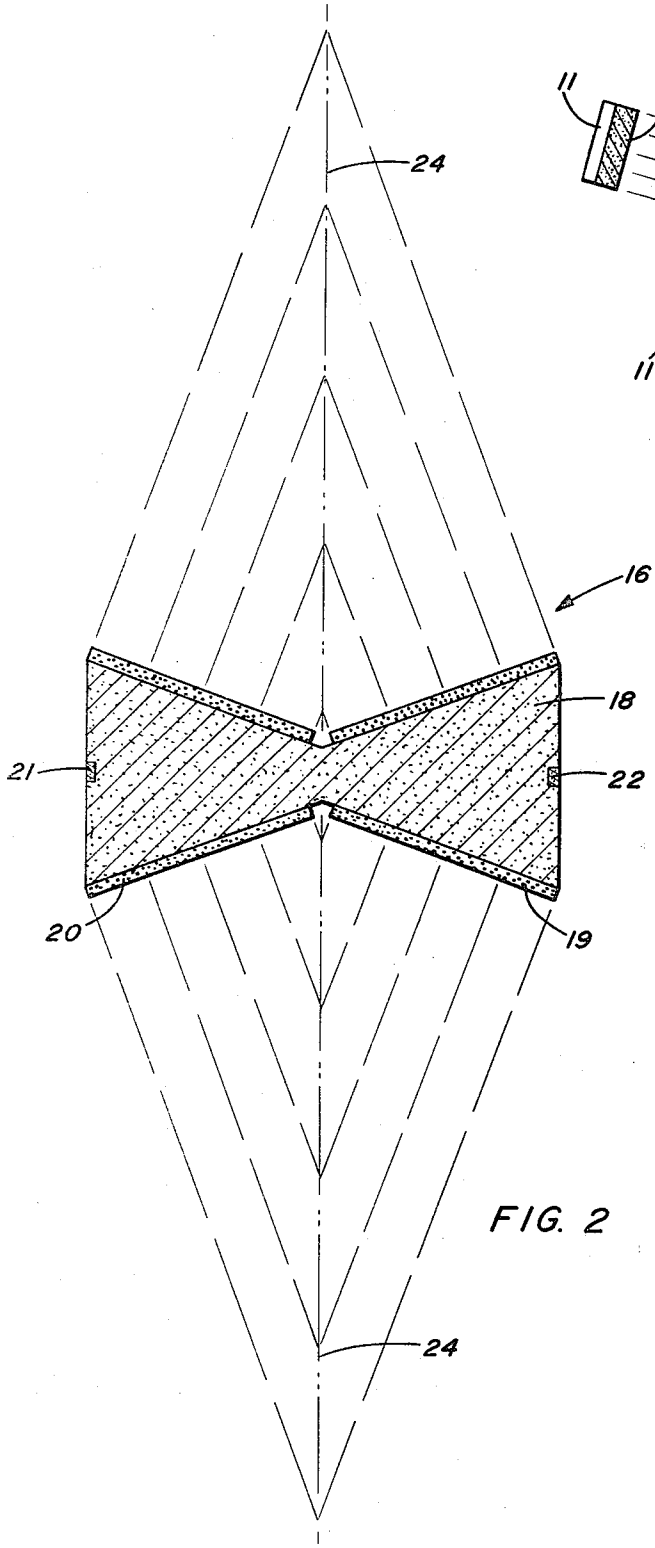



FIG. 2

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# REACTIVE FOCUSING WARHEAD CONCEPT

## STATEMENT OF GOVERNMENT INTEREST

The invention described herein may be manufactured and used by or for the Government of the United States of America for governmental purposes therefor.

## BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to warheads and, more particularly, to warheads having a greater radius of destruction.

2. Description of the Prior Art

The prior art has long been concerned with the problem of producing a warhead which would destroy a target at great distances or which would more certainly destroy a target close to the blast. To solve this problem, the prior art has provided shaped charge warheads, rod warheads, warheads containing secondary warheads which are propelled outward by the blast of the primary warhead and later detonated themselves, and various other types of warheads.

## SUMMARY OF THE INVENTION

Applicants' have invented another type of warhead having magnified destructive effects on targets both near to and far from the blast. The warhead of the present invention contains two separate materials, each of which is explosively inert alone. These materials are carried on the warhead so that upon detonation of the warhead they are propelled along separate paths to an area where they are combined. The materials are such that upon combination they produce a secondary explosion or reaction, thereby extending the destructive radius of the warhead.

An object of the present invention is the provision of a warhead which will destroy targets relatively far from the point of detonation of the warhead.

Another object of the present invention is the provision of a warhead which will more effectively destroy targets relatively near to the point of detonation.

A further object of the present invention is to provide a warhead which will produce a secondary explosion after detonation of the warhead.

A still further object of the present invention is to provide a warhead which will, upon detonation, propel two separate reactive components together to create a reaction.

## BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 illustrates schematically the concept of applicants' invention; and

FIG. 2 shows one form in which applicants' invention could be adapted for use in a warhead.

## DESCRIPTION OF THE PREFERRED EMBODIMENTS

FIG. 1 which illustrates applicants' inventive concept shows two layers of explosives **11** having thereon layers of material **12** and **14**, each of which is explosively inert alone but which, when combined, produce an explosive reaction. As can be seen from the drawing, when explosive layers **11** are detonated, layers **12** and **14** are propelled along separate paths to area **15** where they combine and produce an explosive reaction.

FIG. 2 shows one way in which applicants' invention can be adapted for use on a warhead generally designated by reference numeral **16**. The warhead contains an explosive core **18** and is of generally hour glass configuration. Around one half of the hour glass is layer **19** of one of the explosively reactive elements and around the other side of the hour glass is layer **20** of the other of the explosively reactive elements. The warhead is preferably detonated at each end by detonators **21** and **22**. Such detonation results in the material in



layers **19** and **20** being propelled toward each other to meet at plane **24** which passes through the center of the hour glass warhead. Upon meeting, elements **19** and **20** explosively react to produce secondary explosions thereby extending the destructive radius and effects of the warhead.

Obviously many elements can be used for layers **19** and **20**. The only requirements are that such elements be reactively inert alone and react when they are combined. Also, they should not explode or be destroyed by the impact or other effects of detonation of the warhead. In practice, applicants' have made one layer from an oxidizer and the other layer from a fuel. For example, inhibited red fuming nitric acid has been used as the oxidizer and a conventional rocket fuel designated MAF (mixed amine fuels) has been used as the fuel element. Another combination was 72 percent perchloric acid as the oxidizer and aviation gasoline as the fuel. Obviously, these reactive elements may have to be carried in a binder material to make them suitable for being placed in layer form on the warhead. A slight variation of applicants' concept would involve taking the elements of thermite, i.e., iron oxide powder and aluminum and making one layer out of each of these elements. These would be propelled by the explosion to collide with one another along plane **24**. This collision would induce a reaction between the iron oxide powder and aluminum.

Many modifications and variations of applicants' concept are clearly possible in light of the above teachings. For example, layers **19** and **20** do not have to be entirely of one material. It could be possible to make layer **20**, for example, out of alternating rings of oxidizer material and fuel material and to do the same thing with layer **19**. This could well result in a greater mixture of the reactive elements upon detonation of the warhead and therefore a greater secondary explosion. Also, other ways of propelling the elements towards one another are possible and applicants' do not intend to limit the invention to the hour glass configured warhead. Any warhead configuration which could propel the separate elements for mixture together could be used with applicants' inventive concept. Furthermore, it would be possible to use more than two elements, each of which is explosively inert and which combine to produce an explosion. For example, three or four such inert elements could be propelled toward one another to produce secondary explosions upon combination.

What is claimed is:

**1.** A warhead comprising:

a first and a second material each of which is explosively inert alone but which produce a reaction when combined;

a shaped charge in a shape of an hour glass;

means for detonating said shaped charge; and

means for mounting said first and second material on said shaped charge with the first material mounted on one half of the hour glass and the second material mounted on the other half of the hour glass so that upon detonation of said shaped charge said first and second materials are propelled together to produce a reaction.

**2.** The warhead of claim **1** wherein said first material comprises iron oxide powder.

**3.** The warhead of claim **1** wherein said first material comprises a fuel.

**4.** The warhead of claim **1** wherein said first material comprises mixed amine fuels.

**5.** The warhead of claim **1** wherein said first material comprises aviation gasoline.

**6.** The warhead of claim **1** wherein said second material comprises aluminum.

**7.** The warhead of claim **1** wherein said second material comprises an oxidizer.

**8.** The warhead of claim **1** wherein said second material comprises inhibited red fuming nitric acid.

**9.** The warhead of claim **1** wherein said second material comprises 72 percent perchloric acid.

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