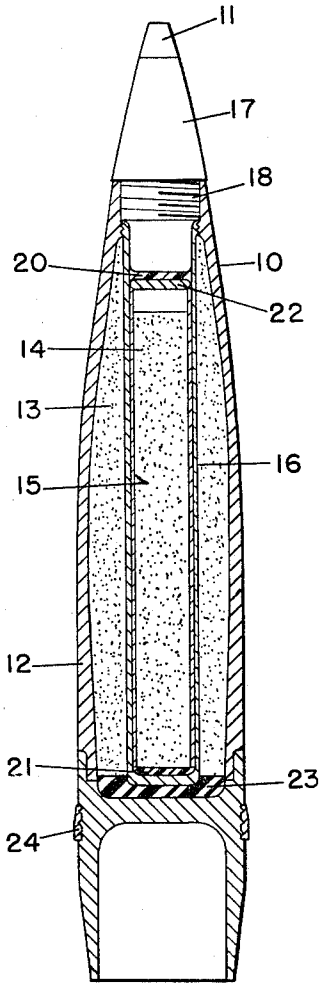
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PROJECTILE

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PROJECTILE

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3 Claims. (Cl. 102—66)

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

This invention relates to a combination high explosive and smoke laying projectile and has for an object to produce a more efficient projectile of this type in which the total weight and dimensions of the projectile have not changed substantially, yet the high explosive is much more efficient and the smoke laying material more effective than a larger amount thereof employed in prior arrangements.

It has been the custom to have a high explosive within a layer of white phosphorus perhaps on the belief the high pressure of an explosive was needed to break the body walls of the projectile carrying the combined smoke laying and explosive material and to throw the smoke screen material outward. When prior arrangements were fired the results were not satisfactory because even in no wind the smoke screen rose to greater heights than were needed and did not hug the ground where it was most needed.

According to the present invention a way has been found for obtaining a better masking effect with less of the same screening material. In accordance with the invention the white phosphorus is subjected to an implosion which has the effect of deferring its contact with oxygen of the air to produce a period of smoke laying having maximum length.

Referring to the single figure of the drawing, a longitudinal cross section of a projectile is shown embodying the construction found useful to obtain the new advantages referred to.

The type projectile **10** shown is representative of a 105 millimeter size artillery projectile although the invention is equally applicable to mortar and rocket projectiles. At the leading end a point detonating fuze **11** is located which is responsive to impact, although a time or proximity fuze may be employed. The main hollow body **12** is of steel or malleable cast iron adapted to be fragmented by a cylindrical jacket of high explosive **13** when fired by the fuze. Axially positioned in the jacket **13** is a quantity of preferably white phosphorus **14** adequately contained within a removable plastic or metal canister **15** reinforced by a thicker metal liner or casing **16** preferably of the same material as the canister. The fuze is preferably located in the portion **17** of the nose between the point **11** and the threads **18** by means of which the nose is attached to the body **12** after the canister **15** containing white phosphorus is inserted throughout the front of the projectile. Pads **20** and **21** are each of appropriate resilient material to absorb shock of set back or other occurrences of shock. The hermetically sealing closure **22** prevents any trace of white phosphorus contacting the surrounding explosive. The plastic base **23** or other inert layer precludes the explosive from attaining any position below the white phosphorus **14** and has the capability to withstand the impact of set back force generated by rapid acceleration.

The rotating band **24** is provided on the peripheral surface of the main body rearmost portion for assisting in spin stabilization. However, the invention is equally applicable to fin stabilized projectiles.

In the preferred projectile construction, relative weight proportions include: substantially 6% white phosphorus, 15% high explosive material, 70% shell body, and 9% fuze, canister and miscellaneous, although tests have been successful employing ratios of white phosphorus to high explosive within the range of 1:3 to 3:1.

Upon impact or detonation substantially all of the phosphorus smoke stays near the ground where heretofore, with the explosive inside the phosphorus, about 80% of that smoke pillared and only about 20% stayed at ground level. With use of the present construction substantially all the phosphorus appears to hug the ground for a considerably longer period of time. The prior location of phosphorus outside the high explosive resulted in more finely divided distribution of the phosphorus which became quickly oxidized and widely distributed. Now the implosive effect upon the phosphorus appears to have a reverse effect in initially compacting the material and slowing its complete oxidation. Another advantage is the fact that the canister **15** is removable out of the front of the projectile after removal of the nose portion **17** to enable use of canisters containing different kinds of phosphorus or agents capable of producing colored smoke, incendiary, luminescent or illuminating effects. A further advantage is greater stability in flight as compared with white phosphorus being located outside the high explosive. The phosphorus, having a melting temperature around 110° F., in its prior location next to the shell body could at warm climatic conditions become liquid before being loaded into a gun and the liquid would not immediately rotate with the projectile spin, causing ballastic imbalance. Further, the radial proximity to the axis of spin minimizes any adverse effect on stability.

Various modifications, changes or alterations may be resorted to without departing from the scope of the invention as defined in the appended claims.

I claim:

1. In an artillery projectile having a removable nose portion threadedly secured in a threaded forward opening of a hollow main projectile body portion,

an inert layer of material seated in and extending across a rearward closed base portion of said body portion, a cylindrical hollow liner having a closed rearward portion seated upon said inert layer,

a jacket of high explosive material surrounded by an inner lateral wall of said main body portion, said liner, and said inert layer, and

a cylindrical hollow canister having a shock absorbing pad seated in the base of said liner, having therein a quantity of white phosphorus, hermetically sealing means extending across said canister forwardly of said white phosphorus, and a second shock absorbing pad forwardly overlying said hermetically sealing means,

the outer lateral dimensions of said canister being less than the innermost dimensions of said threaded forward opening.

2. A projectile according to claim **1** in which the weight ratio of white phosphorus to high explosive is within the range of 1:3 to 3:1.

3. A projectile according to claim **1** in which the proportions by weight include substantially white phosphorus

6%; high explosive material 15%; and projectile body 70%.

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