Fig. 1
PRIOR ART

Fig. 2
PRIOR ART

Fig. 3

Fig. 4

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ANTI-PILLARING WHITE PHOSPHORUS PROJECTILE

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3 Claims

ABSTRACT OF THE DISCLOSURE

A novel burster charge configuration which upon detonation delivers its maximum force at the base and nose sections of a smoke disseminating projectile.

The burster charge is a cylindrical body constructed into a forward and rear separate hollow slender chamber being positioned at each end of the said body and a centrally located bore connecting each said chamber.

This invention relates to a new burster charge configuration more particularly for its use in screening and spotting smoke shells.

A further object of this invention is to provide a burster type smoke shell in which the pillaring effect is reduced or eliminated.

Another object of the invention is to construct a smoke shell containing a novel burster which upon detonation results in greater fragmentation of the shell casing at the nose and base sections.

FIGURE 1 is the longitudinal view of prior art burster charge.

FIGURE 2 is the longitudinal view of the prior art utilizing a double charge.

FIGURE 3 is the longitudinal view of this invention illustrating a burster charge with a double chamber.

FIGURE 4 is the longitudinal view of a smoke generating projectile embodying the burster charge of this invention.

An anti-pillaring smoke shell has been developed by providing shaped inserts between the burster charge and shell casing. An example of this type of device appears in U.S. Patent No. 3,103,888.

U.S. Patent No. 3,760,728 to Pool is an example of utilizing a plurality of impulses to increase the range of a projectile for firearms. In FIGURE 2, numeral 10 designates the projectile which is constructed of two sections 11 and 12. Numeral 11 and 12 are the body and the point respectively. Front and rear chambers 14 and 15 receive a primary 17 and secondary charges 18 of powder, and longitudinal bore or passage 16 connecting said chambers. A receptacle 19 to receive a charge of fulminate is arranged within the primary charge chamber 14 and provided with one or more openings 20 communicating with chamber 14. Tubular stem 21 being in open communication with cap 16 and passage 16 is filling within the passage. Through tube 21 and through the bore 16 a time fuse 22 is ignited by the fulminate to fire the secondary charge 18 whereby point 12 of the projectile is discharged from body 11 and traverses a greater distance. According to this invention there is a greater range secured for the pointed or bullet section of the projectile when the secondary charge is fired. The plurality charge disclosed by Pool increases the range of the projectile as distinguished from the claimed multi-charge burster which causes greater fragmentation of the shell in the nose and base sections.

In modern warfare, the use of smoke as a screening means is of great tactical value in obscuring friendly troops from the sight of the enemy who are enveloped in a smoke cloud inhibiting the hostile force from delivering armed fire power on the friendly advancing troops.

Smoke is composed of small dispersed particles moving with the wind becoming more dilute as it travels from its source. In general, the undesirable excessive vertical rise (pillaring) of the smoke has always presented many problems since the pillaring effect is rapid and therefore does not give sufficient screening. In order to overcome this vertical rise, the continued production of smoke on the hostile position can be maintained only by the rapid continuous firing of shells requiring greater time and expenditure of ammunition than is desired in the modern highly fluid troop movements of today's battle.

Recent development of long, thin-walled projectiles with full-length burster charge has greatly increased the problem of pillaring.

Extensive studies were instituted to correct this excessive pillaring. The burster charge shatters the shell casing. It was the opinion that the large shell casing fragments as are found in utilizing the thicker base and fuse sections entrap the phosphorus thus resulting in a diminished amount of smoke for screening. On this belief, a larger burster charge in cross-section area was needed to break the base and fuse sections and thereby permitting more phosphorus for screening. This approach to our problem was unsatisfactory since poorer results were obtained than in the use of the conventional burster.

FIGURE 1 illustrates the conventional burster charge which is a metal hollow cylinder 1 from about ¾ to 1 inch in diameter and from about 10 to 15 inches in length and containing the conventional high explosive fill 2.

Our further studies led experimentation revealed that an entirely new configuration of a burster charge had to be designed in order to achieve our goal.

According to the present invention a new route has been found for obtaining a reduced pillar of smoke.

In the use of our new burster charge, the explosion of the burster directs its maximum energy at the thicker base and nose area, and the shock will also bring about the fragmentation of the shell body whereby the fill of the shell will be violently scattered in larger portions giving less surface area of the fill to burn. Moreover, the larger portions burned for a longer period of time and started fires more readily. The resulting smoke cloud does not pillar excessively or not at all. The smoke is spread over a wider terrestrial area and permits the enemy cloud to be blown across the land surface by the prevailing winds.

The height of a smoke cloud formed as a result of using our burster charge is lower by a factor of about 25-50% than the height of the cloud using the prior art burster. The full implication of this lower height in relation to the land area screened is self-evident since with the same proportion of fill the lower height gives rise to a denser smoke screen with an accompanying wider terrestrial area. The conventional pillaring cloud being higher is more responsive to wind currents which get under the cloud and move it even higher, and therefore less area is covered.

Our new burster charge produces unexpected and unobvious results through the cooperation of the various association of elements of the filled projectile. The said charge requires about 60% of the high explosive as compared with the conventional burster charge. In view of a smaller charge we received a greater force at the heavier sections of the projectile with corresponding greater fragmentation, and its fill is dispersed over a larger surface of land. The chemical fill can be those which are conventionally used for screening or spotting such as white phosphorus.

In FIGURE 3, numeral 31 is the cylindrical body con-
structured into a forward chamber 32 and rear chamber 33 receiving primary charge 34 and secondary charge 35 of powder, and a longitudinal bore or passage 36 centrally positioned connecting chambers 32 and 33. The said passage contains the primer cord 37 transmitting the explosive force from the forward to the rear charge. The dimensions of chambers 32 and 33 can be from about ½ to 1” in diameter and from about ½ to 3” in length; the chambers can both be of the same dimensions, or one chamber can be larger than the other chamber. The overall length of the burster may be from about 10” to 15”; the outside diameter may be from about 5/8” to 1 ¼”; the diameter of the passage may be from about 0.10” to 0.30”. The burster charge case or receptacle can be fabricated in plastic or metal. The plastic material can be an acrylic or a polyolefin.

FIGURE 4 is the longitudinal cross section of a projectile embodying the burster of this invention to obtain the new and unobvious cooperation of the various elements in the shell. The projectile is representative of a 105 millimeter size artillery projectile, although the invention is equally applicable to modern thin walled shell such as 75, 152, and 155 millimeter types.

The shell body 42 is provided with a rifling band 46. The forward point of the body is the fuse 45 and the booster 49. The fuse is responsive to impact although a time or proximity fuse may be employed. The main hollow body 47 and its base 41 are of steel or malleable cast iron adapted to be fragmented when the booster transmits the impulse from forward explosive charge 34 by means of primer cord 37 to rear explosive charge 35 and thereby disseminating the fill 43. The burster casing 44 is force-fitted within the axially positioned filler. The burster charge tube 31 is located in the central portion of the burster casing and the fuse is then positioned and tightened by means of thread 48 attaching it to the body. The rifling or rotating band 46 is provided for assisting in spin stabilization and for preventing the escape of propellant gases. The invention is equally applicable to external fin stabilized and internal stabilized projectiles.

We claim:

1. A smoke disseminating projectile comprising:
   (1) a hollow shaped body having an opening in the nose end,
   (2) a burster casing mounted within the said shaped body and in sealing relationship with said opening and extends a predetermined axial distance within the said shaped body and adapted to receive a burster charge

(a) said burster charge comprising an outer burster casing with an exterior surface of constant diameter extending the entire length of said casing, end chambers of relatively larger diameter than the intervening communicating chamber and said end chambers containing a high explosive

(b) said burster casing having fuse means sealed at its forward end being adjacent to the said opening

3. smoke generating chemical fill being axially positioned between the inner surface of the shaped body and the exterior surface of the burster casing.

2. In the structure according to claim 1 wherein the chemical fill is white phosphorus.

3. In the structure according to claim 1 wherein said intervening communicating chamber contains a delay element.

4. In the structure according to claim 1 wherein said end chambers have different dimensions.

5. In the structure according to claim 1 wherein said end chambers have substantially the same dimensions.

6. A burster comprising an outer burster casing with an exterior surface of constant diameter extending the entire length of said casing, end chambers of relatively larger diameter than the intervening communicating chamber and said end chambers containing a high explosive.

7. The burster according to claim 6 wherein the intervening communicating chamber contains a delay element.

8. The burster according to claim 6 wherein said end chambers have different dimensions.

9. The burster according to claim 6 wherein said end chambers have substantially the same dimensions.

References Cited

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