United States Patent

Mertens

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[54] AMMUNITION ROUND

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[73] Assignee: **Avco Corporation,** Richmond, Ind.

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[52] **U.S. Cl.** ..... **102/42 C,** 102/43 C, 102/95

[51] **Int. Cl.** **F42b 7/08**

[58] **Field of Search** ..... 102/42 C, 49.4, 34, 34.4, 43 C, 102/95

[56] **References Cited**

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3,334,588	8/1967	Larsen	102/42 C
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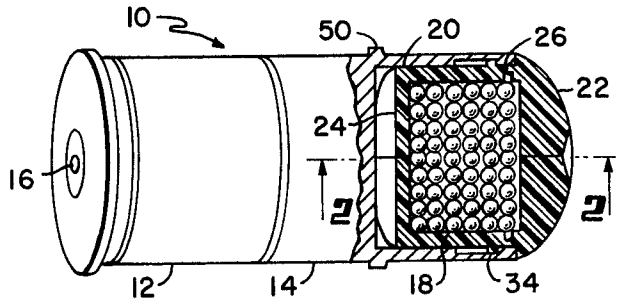
[57] **ABSTRACT**

An ammunition round for providing deployment of a plurality of shot at a distance from a gun or launcher muzzle is disclosed. The shot are held within a container secured to the front end of a projectile body by projections on both the ogive and container body. The container is provided with a weakened shear or clamp area which permits separation of the ogive from the container during setback. The shot is deployed from the container upon deceleration of the projectile body. The use of a rocket motor in the projectile will delay the deployment until after rocket burn-out.

8 Claims, 6 Drawing Figures



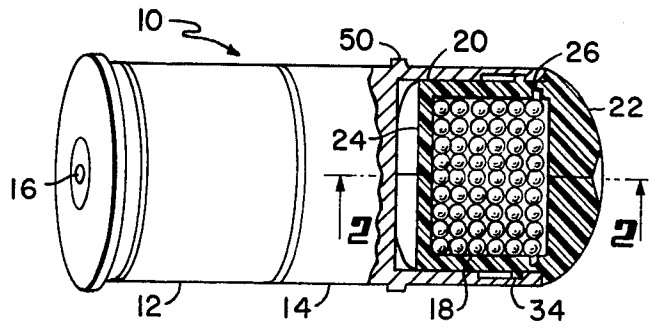


Fig 1

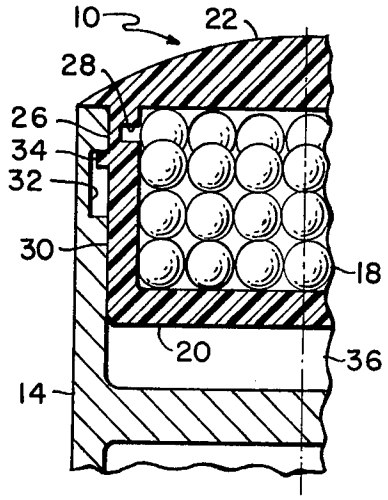


Fig 2

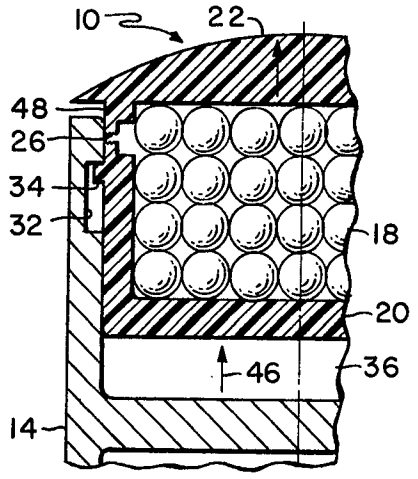


Fig 5

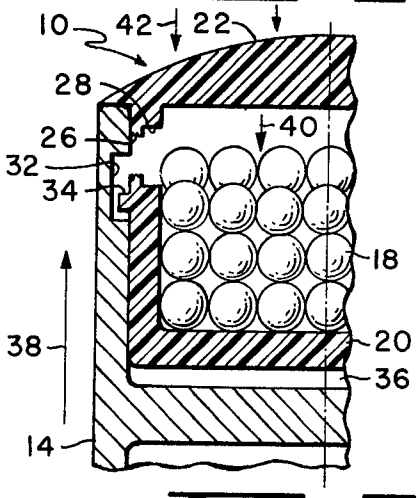


Fig 3

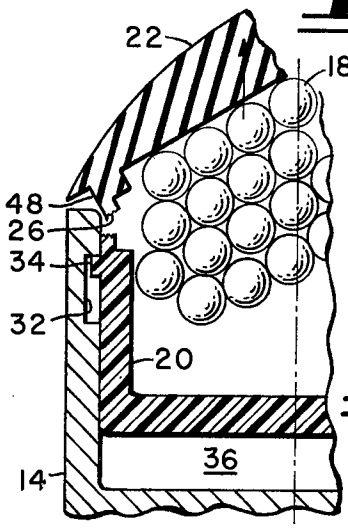


Fig 6

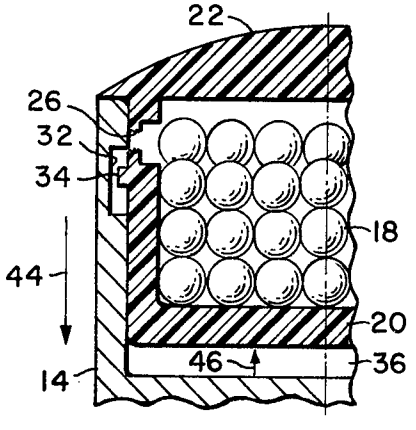


Fig 4

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AMMUNITION ROUND

BACKGROUND OF THE INVENTION

This invention relates to ammunition and more particularly to an improved ammunition round containing a plurality of shot or the like which are deployed from the round at a given distance from the gun muzzle.

Shot ammunition are well known in the art. The best example of a shot ammunition is the shot gun cartridge. When a shotgun shell is fired, the shot leave the cartridge and travel the length of the gun barrel and immediately begin to disperse upon exiting from the barrel nozzle. There are numerous instances when such dispersion of the shot may be excessive and, therefore, undesirable. Such instances are when a greater range with less dispersion is needed and in certain types of military use, rocket-assisted ammunition is used. Early attempts at providing an ammunition which will permit deployment of shot at a designated time or distance from the gun nozzle are shown in Larsen U.S. Pat. Nos. 3,334,588 and Lathrope et al. 3,516,360. The prior ammunition rounds exemplified by these patents have not been entirely satisfactory for certain military usages. A military need has evolved, from jungle fighting, for a quick reaction shotgun type round of ammunition that can be used with existing shoulder-fired weapons. It is also necessary that the existing weapons do not exhibit the severe recoil of a shotgun. Therefore, rocket-boosted principles must be used to meet both requirements. The rocket will provide the additional acceleration required without increasing recoil. The novel housing permits delayed deployment of the shot until deceleration of the rocket projectile body.

Accordingly, it is an object of this invention to provide an ammunition round having a secure container and delayed positive deployment while meeting aerodynamic and ballistic requirements.

A further object of this invention is to provide an ammunition round in which a large number of shot may be contained such that normal handling and environmental conditions will not damage or otherwise activate the warhead.

A still further object of this invention is to provide an ammunition round which maintains aerodynamic drag level at a minimum until rocket energy is expended.

Yet another object of this invention is to provide an ammunition round in which ejection of the shot container from the muzzle is initiated by gun firing, yet deployment of the shot does not occur until deceleration of the projectile body.

One further object of this invention is to provide an ammunition round which is simple and economical in construction and fail safe in operation.

SUMMARY OF THE INVENTION

This invention provides an improved ammunition round for maintaining a plurality of shot containerized after firing of a gun and further providing means for delayed deployment of the shot from the round. The ammunition round includes a shot or pellet container mounted within a projectile body. The shot container comprises a separable ogive. The ogive is separated from the container during setback. The shot are deployed from the container upon deceleration of the projectile body.

Other details, uses, and advantages of this invention will become apparent as the following description of the exemplary embodiment hereof presented in the accompanying drawings proceeds.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings show a present exemplary embodiment of this invention in which:

FIG. 1 is a perspective view of the ammunition round of this invention partially cut away to show the shot container;

FIG. 2 is a cross-sectional view of the warhead ammunition round of FIG. 1 taken along line 2—2;

FIG. 3 is a cross-sectional view of the ammunition round of FIG. 1 during setback;

FIG. 4 is a cross-sectional view of the ammunition round of FIG. 1 showing the ammunition round during initial deceleration;

FIG. 5 is a cross-sectional view of the ammunition round of FIG. 1 showing starting deployment of the shot; and

FIG. 6 is a cross-sectional view of the ammunition round of FIG. 1 showing deployment of the shot.

BRIEF DESCRIPTION OF THE ILLUSTRATED EMBODIMENT

Reference is now made to FIG. 1 of the drawings, which illustrates one exemplary embodiment of the improved ammunition round of this invention, which is designated generally by the reference numeral **10**. The ammunition round includes a cartridge case **12** and a projectile body **14** with a separable ogive **22**. The ammunition round is fired by a conventional ignition-type primer charge **16**.

In the illustrative embodiment herein described, the projectile body **14** is a rocket-boosted projectile. The rocket motor (not shown) is activated by the firing of the primer charge.

The cargo **18**, in this embodiment a plurality of shot, is carried in a cylindrical container **20**. The container **20** is formed at one end with an ogive **22** and a closed bottom portion **24** at the other end. The container **20** may be formed as two separate identical halves for ease of fabrication and assembly. When confined within the projectile the two halves form a firmly closed container. The container **20** may also be a triple unit construction wherein the shot may be placed in a cylindrical one piece container with the two pieces of the ogive clamped to the cylinder by any suitable means. The container **20** may also be formed of other conventional structures and any material such as plastic.

The container **20**, as best seen in FIG. **2**, is formed with a shear area **26** adjacent the ogive **22**. The shear area **26** may be formed by any suitable method such as cutting a groove or channel **28** in the side wall **30** of the container **20**. The container **20** is mounted in the open end of the projectile body **14** for limited axial slidable movement therewith. A channel **32** is formed along the inner wall of the body **14**. Cooperating retainer means **34**, such as lugs or a ring, project from the outer surface of container **20** and cooperate with the channel **32**. The projectile body **14** and container **20** cooperatively define a setback chamber **36**. The outer periphery of ogive **22** extends beyond the outer wall dimension of the container **20** to cooperatively engage the end of the projectile body **14**. Thus, it can be seen in FIG. **2** that the ogive **22** and retainer **34** secure the cargo container **20** within the projectile body **14** so as to resist either fore or aft axial motion prior to firing. The shear area **26** has sufficient strength to withstand normal handling but will break due to tensile stress produced by setback forces when the gun is fired.

The step-by-step operation of the ammunition round may be observed by referring to FIGS. **2–6**. FIG. **2** shows the ammunition round **10** in the at rest or ready to fire condition. Upon firing of the round, the projectile body **14** is accelerated in the direction of arrow **38** and setback of the cargo **18** and cargo container **20** occurs in the direction of arrow **40**. During setback forces, the shear or clamp area **26** separates thereby permitting the cargo container **20** to move rearwardly into the setback chamber **36** until it contacts the aft end of the setback chamber **36** formed by the body **14**. At this point the container has separated and the aft end now takes the form as a simple cup confined by the projectile body. The front end now becomes a two-piece ogive and ram air, indicated by force arrows **42**, and the acceleration of the projectile body **14** hold the ogive **22** in place. During the period illustrated by FIG. **3**, the rocket motor is burning and thereby continuing the acceleration of the projectile body **14** initiated by the firing of the gun. This acceleration provides deferred deployment of the cargo after the projectile has been launched. It should be noted, however, that a rocket motor is not necessary and that the ammunition round will function equally as well as a rocketless round. In such case the deployment will occur at muzzle exit or whenever deceleration of the projectile begins.

After rocket burn-out, FIG. 4, a drag force in the direction of arrow 44 acts on the projectile body 14 and ogive 22. At this time, a set forward of the cargo container 20 and cargo 18 occurs in the direction of arrow 46. The set forward of cargo container 20 continues until the retainer 34 engages the forward wall of the channel 32, as shown in FIG. 5. The cargo 18 continues forward to engage and displace ogive 22 from the projectile body 14. In this embodiment, the ogive 22 is a split ogive which greatly facilitates the removal of the ogive. The force of the cargo 18 moves the ogive 22 forward until the flange 48 clears the end of the projectile body 14 after which the ogive 22 is free to move radially to expose the cargo 18 and permit the deployment of the cargo.

It should be further noted that the projectile body 14 may include a land 50 which cooperates with a rifling groove to impart spin to the projectile, if desired.

While the ammunition round hereinbefore described has been specifically described as a rocket-assisted ammunition round, the ammunition round is also applicable to non-rocket type rounds. The ammunition round permits the delayed deployment of the cargo until deceleration of the projectile body. The ogive reduces drag levels until the projectile energy, in this embodiment a rocket energy, is expended. It can be seen that the overall structural configuration of the ammunition round results in a simple, inexpensive method of achieving both a secure container and delayed action, positive deployment of the cargo while meeting aerodynamic and ballistic requirements. Accordingly, the ammunition round of this invention accomplishes the objectives hereinbefore set forth.

While a present exemplary embodiment of this invention has been illustrated and described, it will be recognized that this invention may be otherwise variously embodied and practiced by those skilled in the art.

What is claimed is:

1. An ammunition round comprising:

an open-ended projectile body;

a cargo container slidably mounted within said open-ended projectile body, said container being formed with an ogive at the front end and a closed bottom portion at the other end;

a plurality of projectiles mounted in said cargo container;

said closed bottom portion and said projectile body defining a setback chamber;

means mounting said cargo container at the forward end of said projectile body for preventing fore and aft movement of said cargo container relative to said projectile body in the absence of setback forces; and

separating means responsive to setback forces for separating said cargo container from said ogive wherein said cargo container and enclosed projectiles move rearwardly into the setback chamber during acceleration of the projectile body whereby said enclosed projectiles are deployed from said cargo container upon deceleration of said projectile body.

2. An ammunition round as set forth in claim 1 in which said projectile body is formed with a slot along the inner wall surface; and

in which the outer wall of said cargo container is formed with a retainer for cooperatively engaging said projectile body slot wherein axial movement of said cargo container is limited by the edges of said slot.

3. An ammunition round as set forth in claim 2 in which said separating means comprises a shear area, said shear area being a reduced thickness portion of the cargo container wall adjacent said ogive wherein said reduced thickness will separate in the presence of setback forces.

4. An ammunition round as set forth in claim 3 in which the outer periphery of said ogive projects radially outward from the body of said cargo container to cooperatively engage the forward end of said projectile body wherein said peripheral extension and said retainer cooperatively engage said projectile body thereby preventing fore and aft axial movement of said cargo container in the absence of setback forces.

5. An ammunition round as set forth in claim 4 in which said ogive is a split ogive.

6. An ammunition round as set forth in claim 5 in which the plurality of projectiles comprises a plurality of shot.

7. An ammunition round as set forth in claim 6 in which said cargo container and ogive are plastic.

8. An ammunition round as set forth in claim 7 in which said open-ended projectile body is detachably secured to a detonating cartridge.

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