

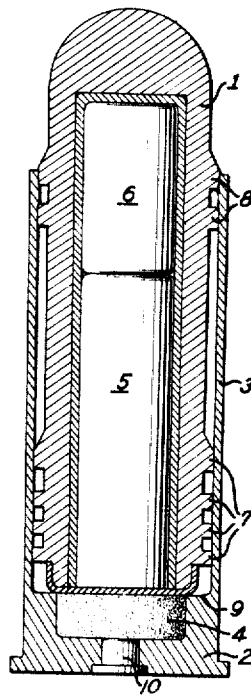
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H. STADLER ET AL

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FIXED AMMUNITION

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INVENTORS

HANS STADLER
HEINZ GAWLICK

BY *Burgess Dicklayers Sprung*
ATTORNEYS

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FIXED AMMUNITION

Hans Stadler, Nurnberg, and Heinz Gawlick, Furth, Bavaria, Germany, assignors to Dynamit Nobel Aktiengesellschaft, Troisdorf, Bezirk Cologne, Germany, a corporation of Germany

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5 Claims. (Cl. 102-41)

This is a continuation-in-part of application Ser. No. 325,260, filed Nov. 21, 1963, now abandoned.

The invention relates to fixed ammunition in general, and more particularly to a novel construction for a round of fixed ammunition primarily intended as artillery practice ammunition.

For artillery practice, special ammunition is generally used which is less expensive and has a less effective range than the regular ammunition. This practice ammunition to be effective and to fulfill its purpose should imitate the characteristics of the conventional ammunition as closely as possible, and should be as ballistically accurate as possible. Conventional practice ammunition is provided with a much smaller propellant charge than conventional ammunition and is generally of substantially shorter length. The projectiles of this practice ammunition are generally constructed of a soft heavy material, such as lead, or lead alloy (referred to herein and in the claims as lead material), for purposes of economy and in order to provide high specific weight, for ballistic accuracy and low wind sensitivity, for less wear of the gun barrels, and for better adjustment to the barrel dimensions. The lead material is, of course, more delicate and subject to damage than the hard metals of which many conventional projectiles are constructed, and when handled in the manner of conventional ammunition, as is customary in practice firing and for training purposes, the same is subject to damage. Due to the reduced size of practice ammunition projectiles, even a relatively slight degree of damage or soiling may considerably adversely affect the firing characteristics, function of the fuse, etc., of this ammunition.

In the ammunition round according to the invention, as in conventional ammunition, it is desirable, and in fact necessary for accuracy and range, to provide guide rings which extend outward from the body of the projectile and act to stabilize it as it passes through the gun barrel. These guide rings serve as a seal to prevent the exploded propellant gases from escaping through any clearance spacing which exists between the projectile and the gun barrel, and in the case of rifle gun barrels, the guide rings are cut into by the rifling and cooperate with the rifling to impart a rotary motion to the projectile for ballistic stabilization.

To provide a better degree of ballistics stability and gas sealing, the projectile of the invention is provided with a plurality of guide rings surrounding the forward portion of its body, and an additional plurality of guide rings surrounding the rear portion of its body.

Having made the choice of lead, or in fact any soft material, for the projectile material, the problem of protecting these guide rings from damage arises since they are preferably and expeditiously integrally constructed with the projectile body itself, and consequently as projecting members made of soft material, they are highly susceptible to damage in handling. In the case of certain prior art artillery practice rounds, damage particularly to the forward guide rings frequently occurred during handling prior to use since one or more of such forward guide rings were exposed. Such damage often resulted in destroying the sealing capability of the guide rings, and ren-

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dered insertion and passage of the projectile in the gun difficult.

The hazard of handling damage to the projectile guide rings, in particular the forward guide rings, since the cartridge casing normally surrounds the rear rings, is solved in accordance with the invention by providing a casing which protectively surrounds the projectile over a major portion of its length, and is in abutting contact with all of the guide rings on the projectile, including the forward guide rings. Thus, by reason of the protective covering afforded by the casing wall and projectile guide ring arrangement of the invention, the hazard of damage to the guide rings is substantially eliminated.

The casing is also provided with an interior annular shoulder which is in abutting, supporting contact with the rear end portion of the projectile so as to substantially preclude any lateral displacement or tilting of the projectile, such as might occur if the round were dropped accidentally.

The round of fixed ammunition in accordance with the invention therefore consists of a projectile having a plurality of guide rings surrounding its forward portion, and a plurality of guide rings surrounding its rear portion, such guide rings being integral with the projectile, a casing having a wall which protectively surrounds the projectile over a major portion of its length and which is in adjacent abutting contact with all of the guide rings on the projectile, said casing having an annular interior shoulder disposed for abutting supporting contact with the rear end of the projectile, and an interior propellant charge chamber disposed adjacent to the rear end of the projectile, and an interior primer chamber adjacent to and in communication with the propellant chamber. As in conventional ammunition rounds, a propellant charge is disposed within the propellant chamber and a primer, such as conventional percussion type primer is disposed within the primer chamber to serve for ignition of the propellant charge.

It should be noted that while preferably the projectile and its integral guide rings are made of a soft material, such as lead, such projectile need not necessarily be a solid projectile made of the same material, but can be hollow and/or reinforced by a member or members made of a different material. The invention contemplates a projectile having at least its external portion made of a soft material.

Preferably, the projectile is constructed so that its furthestmost guide ring is disposed at an axial position with respect to the rear end of the projectile which is at least 70% of the projectile length, and the casing is extended past at least a portion of such forwardmost guide ring and protectively surrounds it.

One object of this invention is to provide a round of fixed ammunition suitable for practice purposes which is protected against handling damage.

A further object of the invention is to provide a round of fixed ammunition as aforesaid which allows the use of a projectile made either of a soft material or having an outer covering made of a soft material, which is substantially protected by the casing of the round.

Other and still further objects and advantages of the invention will become apparent from the following detailed description read in conjunction with the accompanying drawing which shows a vertical section of a round of ammunition according to a preferred embodiment of the invention.

Referring to the embodiment shown in the drawing, the projectile 1, i.e., the shell of the training round, is constructed of lead or lead alloy in the conventional manner. The forward end of the projectile 1 is surrounded by forward guide rings 8 which are integrally formed of lead material of projectile 1. The rear portion of the projec-

tile 1 is surrounded by the guide or rotating rings 7, also integrally formed of the lead material. The guide rings 7 and 8 stabilize the projectile 1 on its journey through the gun barrel (not shown) upon firing, and are generally cut into by the rifling in order to impart the rotary motion to the projectile 1 and serve as a seal for the exploding gases. In order to obtain a good sealing, the number of the guide rings 7 and 8 should be kept as high as possible, with at least a total of four guide rings being preferably provided. There should be at least two guide rings 8 surrounding the forward end of the projectile 1 and at least two and more preferably, three guide rings 7 surrounding the rear end of the projectile 1.

The interior of the projectile 1 as shown, is hollow and is provided with a charge 5, as for example, an explosive priming charge, an explosive charge or tracer charge, and a smoke charge 6. It is understood however, that the construction of the interior of the projectile does not constitute a part of the instant invention and the same may be constructed in any known or conventional manner and provided with any of the known or conventional filling materials or charges 5 and 6.

The projectile 1 is fixed within the casing 2, the side walls 3 of which in accordance with the invention protectively surround a major portion, and preferably at least 70%, as for example 75% of the length of the projectile. As shown, the upper edge or mouth of the casing surrounds and terminates at the forwardmost guide ring 8, thus protecting all of the delicate guide rings 8 and 7, and providing a firm sealing and positioning of the projectile 1 in the casing 2. The casing 2 may be constructed of conventional materials, as for example brass or steel. The base of the casing 2 has a reduced interior diameter so as to provide an annular shoulder 9 which serves as a support for the base of the projectile 1 and prevents axial displacement thereof in the casing in the event of rough handling, dropping or the like. The hollow interior portion of the casing 2 base below the rear end of the projectile 1 defines a chamber for a conventional propellant charge 4, as for example a charge of smokeless powder, and the casing 2 is also provided with a chamber containing a conventional primer 10, such as a percussion primer or cap 10, said primer chamber being disposed in communication with the propellant 4 chamber so that the propellant 4 can be ignited by the primer 10.

Apart from preventing damage to the soft material of the projectile 1 wall and notably to the delicate guide rings 7 and 8, the ammunition round construction in accordance with the invention provides for better positioning and support of the projectile 1 in the casing 2 so that loosening thereof is prevented. The construction of the invention also assures more accurate and uniform firing characteristics. While the construction illustrated herein is primarily intended for ammunition of a calibre larger

than that of small arms, and is primarily intended for practice or training artillery ammunition, the construction is also suitable for any other type of ammunition wherein protection of the projectile is necessary or desirable.

While the invention has been described in detail with reference to certain specific embodiments, various changes and modifications which fall within the spirit of the invention and the scope of the appended claims will become apparent to the skilled artisan. The invention is therefore only intended to be limited by the appended claims or their equivalents wherein we have endeavored to claim all inherent novelty.

What is claimed is:

1. A round of fixed ammunition consisting of:

- (a) a projectile having a plurality of guide rings surrounding its forward portion, and a plurality of guide rings surrounding its rear portion, said guide rings being integral with said projectile;
- (b) a casing having a wall which protectively surrounds said projectile over a major portion of its length, said wall being in adjacent abutting contact with all of the guide rings on said projectile, and said casing having an annular interior shoulder disposed so as to be in abutting supporting contact with the rear end of said projectile, said casing having an interior propellant charge chamber disposed adjacent to the rear end of said projectile, and an interior primer chamber disposed adjacent to and in communication with said propellant chamber;
- (c) a propellant charge disposed within said propellant chamber; and
- (d) a primer disposed within said primer chamber.

2. A fixed round of ammunition according to claim 1 wherein the furthestmost forward guide ring on the projectile is disposed thereon at an axial position with respect to the rear end of said projectile which is at least 70% of its length and the casing protectively surrounds and extends past at least a portion of said guide ring.

3. A fixed round of ammunition according to claim 1 wherein the projectile is made of a soft material.

4. A fixed round of ammunition according to claim 1 wherein the projectile is made of lead and has a hollow interior chamber.

5. A fixed round of ammunition according to claim 2 wherein the projectile is made of lead and has a hollow interior chamber.

No references cited.

SAMUEL FEINBERG, *Primary Examiner*.

ROBERT F. STAHL, *Examiner*.