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PRIMER FOR CONSUMABLE ROUND

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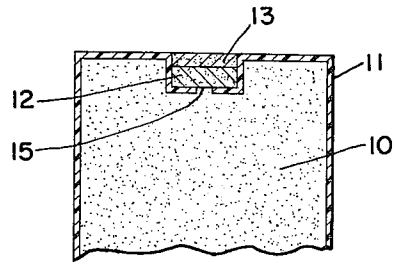


FIG. 1.

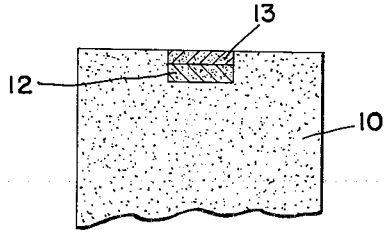


FIG. 2.

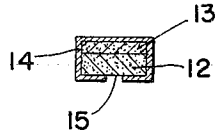


FIG. 3.

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PRIMER FOR CONSUMABLE ROUND

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4 Claims. (Cl. 102—43)
(Granted under Title 35, U.S. Code (1952), sec. 266)

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

This invention relates to a light weight small arms round of ammunition and has for an object to produce a so called consumable round of this type which is ballistically similar to the standardized metal case round and which eliminates a disadvantage that has been discovered for such previous round, namely a too prevalent number of misfires. It has been discovered that a substantial portion of such misfires has been due to the consumable round being too yieldable for the firing pin to function satisfactorily when there is no base flange on the cartridge case as occurs with the usual round having a metal case needing extraction of a fired case from a gun.

Investigation has shown the solution of the problem does not reside in the provision of a stiff metal base and flange enabling extraction of the base after firing because the base is the heavy portion of the case and efforts to obtain a lighter weight case have been reluctant to compromise with retention of a weighty portion of the standard case.

According to this invention it has been found that a change in the primer is sufficient to enable a usual consumable round to be free of this objectional percentage of misfires. The term "primer" is used throughout the specification in the same guise as is commonly used in the ordnance art, that is, explosives employed to supply the initial impulses in explosive trains, further characterized by those sensitive explosives or mixtures used to initiate the explosion of other explosives, generally less sensitive. This is the definition adopted in Hayes, "Elements of Ordnance," 1938. The usual primer cup and anvil has been changed to make the primer function satisfactorily even though it be as yieldable as happens in the consumable round. More specifically the usual primer mix is used but without the anvil. Instead a more sensitive explosive is used and is fired by impingement of the firing pin. This more sensitive explosive fires the usual primer material which then functions as a booseter to fire the propellant. This invention is believed to reside in the discovery of the cause of the misfires referred to, after which the use of a sensitive explosive, and a booster charge may be within the skill of the art once the nature of the difficulty has been found.

Still more specifically an explosive cap of the type used in toy pistols has been placed in rear of the primer mix for the purpose stated and both the primer and the rear topping charge may be wrapped together or separately in a thin paper envelope or an adhesive may be used for the topping charge. Preferably an arrangement like that illustrated has been found most suitable to fill the old need for a consumable case after German and Belgian efforts to devise such a case had not proven satisfactory.

Referring to the drawings:

FIG. 1 is a longitudinal section through one embodiment of this invention shown magnified for a 30 caliber consumable round having a consumable case rear end portion.

FIG. 2 is a view similar to FIG. 1 in which no consumable plastic case is used (caseless round).

FIG. 3 shows this invention embodied in a metal primer case for use in a metal cartridge case.

As shown in FIG.1 propellant **10** for a projectile or blank round is shown within a consumable case **11** of some known type having in the rear of case **11** a primer mix **12** of any well known sort having in rear thereof a topping charge **13** of a material that is more sensitive to explosion than is the primer mix. This charge **13** is preferably made of about the following constituents by weight: potassium chlorate 44%, antimony sulfide 49%, red phosphorus 5.5%, magnesium carbonate 0.5%, and a binder of the type used for primer materials such as a gum arabic or gum tragacanth 1%. The red phosphorus is the fuel which is ignited first by heat or friction or both and may be varied from about 3% to 6%. The potassium chlorate is known to be the oxidizer, the antimony sulfide is for the creation of friction and heat. In event of the formation of phosphoric acid the magnesium carbonate is a neutralizer for the acid. The binder may suffice to hold the topping charge in place without the need for the usual thin paper envelope in which this general type charge has been used when sold for toy pistols.

In FIG. 2 is shown the same invention as illustrated in FIG. 1 except that there is no consumable case **11** rather FIG. 2 represents a caseless round and the primer and topping charges **12** and **13** are held together as a unit by either a suitable binder or an envelope of thin paper. The propellant is likewise held together by a thin consumable envelope of paper, or silk, or by an appropriate binder, of which a number are known.

In both FIGS. 1 and 2 the firing pin or hammer is preferably provided with a conical or tapered point capable of entering the topping charge creating tenough heat by friction to ignite the phosphorus and the rest of the topping charge, then the primer mix, and next the propellant.

In FIG. 3 the metal primer case **14** contains the primer mix **12** and topping charge **13** and is for use where a metal cartridge case is used. The firing pin enters the top of the charge **13** in FIGS. 1 and 2 but in FIG. 3 it must dent in the closed end of the metal case **14** and ingite the sensitive phosphorus and other ingredients of the charge **13**. The primer flame issues through hole **15** in the metal case for igniting propellant. In FIG. 2 there is no hole corresponding to hole **15** in FIG. 3 because the primer flame issues in any lateral and downward directions to fire the propellant **10**. In FIG. 1 a hole **15** is shown but since the walls **11** of that hole are consumable the primer flame will issue both laterally and downward although slightly more heavily through hole **15** in this FIG. 1.

An advantage of this improvement in FIGS. 1 and 2 is the reduction in misfires with a caseless or consumable case where no base flange is present for extraction of a fired case when there is no case needing to be extracted. An advantage of this invention in each of the three embodiments illustrated is the elimination of the hazard of assembling a primer containing the usual anvil when dependence is placed on friction and the heat resulting therefrom instead of depending upon crystal shear. The assembly of primer cups containing an anvil has proven too hazardous. In all figures a bolt or breechclosure prevents any rearward fire of the round.

The term "consumable round" as applied to a cartridge includes one which has no case, or better known as "caseless," and one which has a consumable casing.

We claim:

1. In a round having a consumable cartridge case the combination of a propellant, a primer in the rear of said propellant, said primer comprising a body of primer mix contiguous said propellant in a topping charge defined by a body of explosive material fixed on the rear of said primer mix body, said topping charge being more sensi-

tive to ignition by impact than is said primer mix whereby upon impact by a firing pin or the like said topping charge fires said primer mix and said primer mix in turn fires said propellant, and said topping charge including the following ingredients in percentage by weight:

Potassium chlorate	44
Antimony sulfide	49
Red phosphorus	5.5
Gum arabic or gum tragacanth	1.0
Magnesium carbonate	0.5

2. In a caseless round the combination of a propellant, a primer in the rear of said propellant, said primer comprising a body of primer mix contiguous said propellant and a topping charge defined by a body of explosive material fixed on the rear of said primer mix body, said topping charge being more sensitive to ignition by impact than is said primer mix whereby upon impact by a firing pin or the like said topping charge fires said primer mix and said primer mix in turn fires said propellant, and said topping charge including the following ingredients in percentage by weight:

Potassium chlorate	44
Antimony sulfide	49
Red phosphorus	5.5
Gum arabic or gum tragacanth	1.0
Magnesium carbonate	0.5

3. In a round the combination of a propellant, a primer in the rear of said propellant, a consumable enclosure for said primer, said enclosure defining a forward end with a generally axial perforation therethrough which forward end is contiguous the propellant, said primer comprising

a body of primer mix in the forward end of said enclosure and a topping charge defined by a body of explosive material fixed on the rear of said primer mix body, said topping charge being more sensitive to ignition by impact than is said primer mix whereby upon impact by a firing pin or the like said topping charge fires said primer mix and said primer mix in turn fires said propellant through said enclosure perforation.

4. The combination according to claim 3 in which said topping charge includes the following ingredients in percentage by weight:

Potassium chlorate	44
Antimony sulfide	49
Red phosphorus	5.5
Gum arabic or gum tragacanth	1.0
Magnesium carbonate	0.5

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