

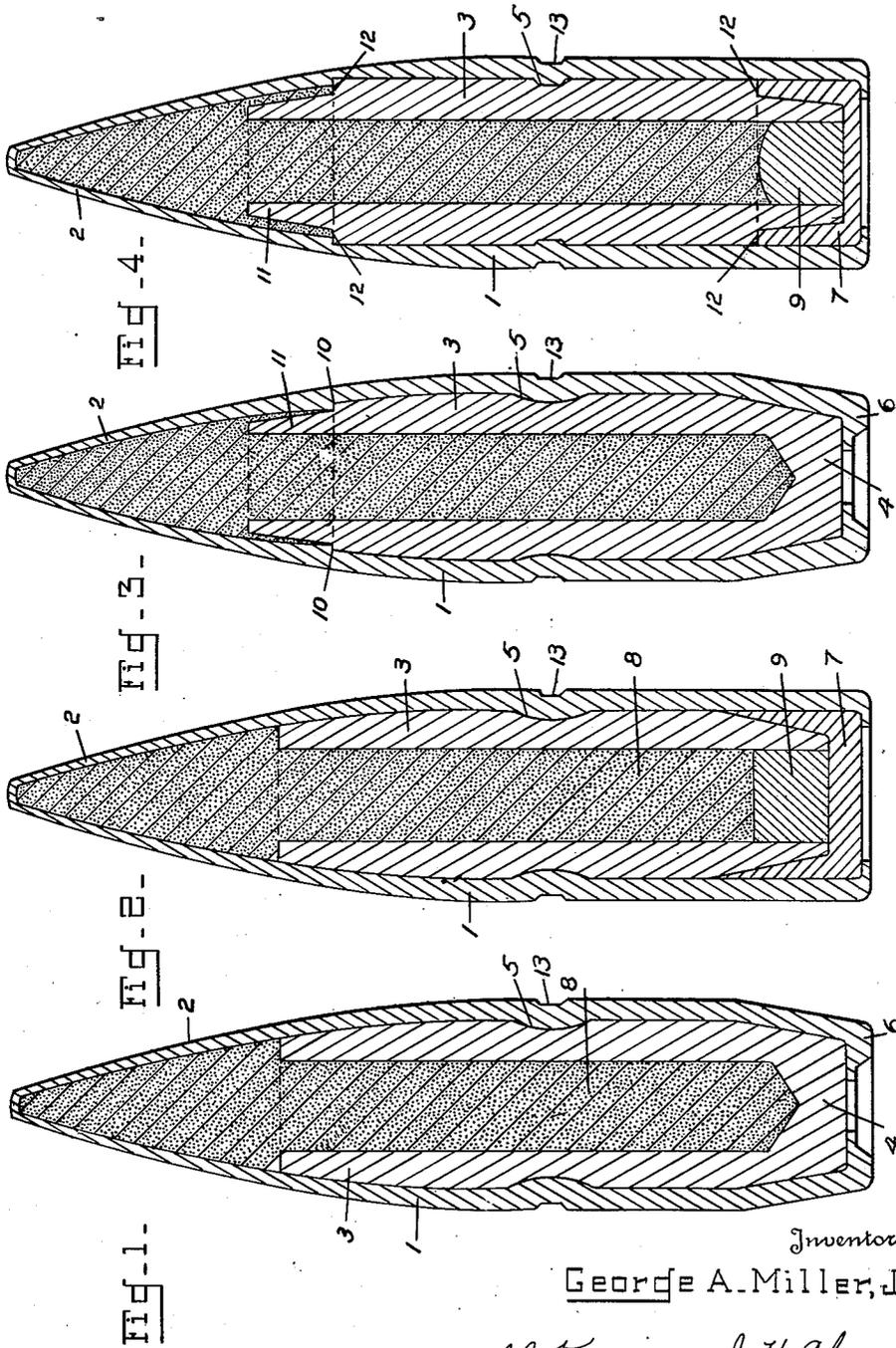
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2,532,323

BULLET

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## UNITED STATES PATENT OFFICE

2,532,323

BULLET

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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 bullet, and in particular to a bullet for use with small and medium arms. While the bullet may be loaded partly or wholly with high explosive, it is intended principally as a carrier for incendiary material.

In a properly designed bullet the modern types of incendiary compositions will ignite on impact without any special percussion mechanism. The conditions of intended use of the bullet will in large measure affect the design thereof. For example, a successful attack on the gasoline tank of an airplane requires that the incendiary powers of a bullet be effective after it has passed through an outer armor and traversed some distance therebeyond. This may be accomplished by delaying ignition beyond initial impact or by maintaining the incendiary outburst for a time after initiation. The bullet of the invention is well adapted to accomplish the latter although it is not intended to be limited to such functioning as will appear as the description proceeds.

It is known to use a hollow bullet with thin nose and filled with incendiary material. Such bullets, however, are not designed for penetration, but are entirely collapsible on impact and therefore limited in use with respect to present day requirements. The bullet of the invention provides a reinforcement in the form of an inner sleeve which is efficacious in many respects even though the precise phenomena basically responsible for its successful employment are not entirely understood. It would appear, however, that the reinforcing sleeve serves to retain the form of the main body of the bullet while penetration of the target is effected after initiation, and it would further appear that there is some sort of coaction between the forward edge of the sleeve and the ogive which conspires to produce a more effective initiation of the incendiary composition than is usual with a simple, loaded, hollow shell, the sleeve being more or less free to advance not only with the bullet body but also in advance thereof as the ogive is checked in flight and collapsed.

It is therefore an object of the invention to produce a charged bullet which will preserve its body form during penetration.

It is a further object of the invention to produce a reinforced incendiary bullet.

It is a further object of the invention to pro-

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duce a hollow bullet having an inner sleeve reinforcement movable relative to the body of the bullet.

It is a further object of the invention to produce an incendiary bullet effective to ignite a target after penetration of an outer armor thereon.

The specific nature of the invention as well as other objects and advantages thereof will clearly appear from a description of a preferred embodiment as shown in the accompanying drawings in which:

Figures 1 to 4 are axial sectional views of bullets according to the invention.

Referring to the drawing by characters of reference there is shown in Figure 1 a boat-tailed bullet comprising a jacket 1 which may be gilding metal, cupro-nickel, mild steel or coated steel provided that the thickness near the nose can be produced to the desired dimensions. The thickness of the metal near the nose of the jacket determines the sensitivity of the projectile to functioning on impact. Preferably this reduced thickness is obtained through a gradual diminishing of the jacket thickness in the ogival portion 2.

A tubular body insert 3, nested within the jacket and terminating in the ogival portion may be of any desired material such as brass, steel, plastic, etc., dependent on the type of functioning desired. Where metallic objects are to be penetrated, a metal body is to be preferred, and for very hard materials, like light armor, a steel body which can be heat treated to increase the hardness and strength should be used. As shown in Figure 1, the base closure 4 for the tubular body is integral therewith. A central annular depression 5 is formed in the body to receive a crimp 13 in the jacket for keying the body to the jacket. The jacket is crimped over the rear of the body as shown at 6. Obviously the incendiary material will be loaded partly in the ogive as preformed pellets or otherwise, and partly in the tubular body prior to insertion of the body into the jacket.

In Figure 2 is shown a bullet having a separate base closure. This comprises a shaped cup 7 of suitable material, preferably of metal having sufficient ductility to be formed to the desired shape. This closure may be used both for sealing the base of the bullet against leakage of the chamber gas into the jacket which would disrupt the jacket, and for providing a means for adjusting the longitudinal ballistic balance of the bullet. For example, where a light material is

needed, aluminum or magnesium or their alloys could be used, and where a heavy material is needed, lead or some lead alloy could be employed. Thus, any material having the desired ductility, specific gravity and resistance to disintegration by the explosive gases in the weapon would be suitable.

The incendiary composition 8 may consist of a mixture of powdered metal or metals, such as magnesium, aluminum, zinc, cerium, thorium, or a combination of them, with an oxidizing agent or agents, such as metallic or non-metallic chlorates, perchlorates, nitrates, chromates, permanganates or peroxides. The sensitivity of the mixture to ignition upon impact can be adjusted by varying the amount of oxidizing agent and by the selection of the combination of metal powders.

Projectiles which have been assembled in the manner described in the foregoing description, when fired from a weapon at an appropriate velocity will function with a flash of light and generate sufficient flame to ignite combustible material, such as gasoline vapor when the projectile strikes an object offering resistance to penetration equal to thin mild steel.

A lead plug 9 is shown behind the incendiary material in the tubular body, which serves as a pressure-communicating medium during loading, as a filler after the compressing operation is completed and as a further protection for the incendiary charge against firing shocks. This plug may first be inserted in the form of a ball which is subsequently shaped by pressure to the form of the tube center, or it may be inserted in any convenient original form.

In order to further obviate any danger of the jacket stripping from the body insert on firing, the forms shown in Figures 3 and 4 are provided. A shoulder 10 is provided on the inner wall of the jacket to form a stop for the body insert, and in order that the shoulder may be located in the thicker portion of the jacket, the point of contact for this shoulder is located on the body insert somewhat behind the forward end, leaving a reduced portion 11 extending into the ogive to cooperate with the nose in initiating the composition on impact in the required manner.

In Figure 3 the body insert is closed at the rear as in Figure 1. In Figure 4 the body insert is formed with a shoulder 12 at each end, the rear one resting on the rim of the closure cap. In this body insert the two ends are symmetrical and this presents an advantage since either end may be inserted first in assembling.

I claim:

1. A projectile comprising a tubular body portion, a jacket fitted over said body portion, and tapering to an ogive in front of said body portion, a rearwardly facing annular shoulder in the inner wall of said jacket and a forwardly facing annular shoulder on the outer wall of said tubular body portion fitted on said shoulder on said jacket.

2. In a projectile according to claim 1, a boat-tailed portion on said tubular body member in

advance of said shoulder on said body member, said boat-tailed portion being spaced from the inner wall of said jacket.

3. In a projectile according to claim 1, a rearwardly facing annular shoulder on said tubular body portion and a cup member closing the rear end of said tubular body portion and engaging said rearwardly facing annular shoulder by its rim.

4. In a projectile, a steel tubular body portion having a closed rearward end, said portion having an externally reduced frusto-conical end forming a forwardly-facing shoulder, a jacket fitting and enclosing said body portion and including an ogive extending forwardly of the extreme forward end of said body portion, said jacket having a rearwardly-facing, internal shoulder fitting against the shoulder of said body portion and having a gradually decreasing wall thickness from said shoulder forwardly to the tip of said ogive, said ogive and body portion forming a single chamber adapted to be filled with a charge.

5. A projectile as recited in claim 4, the two ends of said body portion being identical.

6. A projectile as recited in claim 4, the two ends of said body portion being identical, a cap fitting over the rearward end of said body portion and filling the space formed by said frusto-conical reduced end and said jacket, said jacket extending over the rearward end of said cap, said ogive and bore of said body portion forming a single chamber adapted to be filled with a charge.

7. A projectile comprising a tubular body portion, a jacket fitted over and completely inclosing the side walls of said body portion and tapering to an ogive forwardly of said body portion, the wall of said jacket being weakened by a reduction in wall thickness forwardly of said body portion, a charge in said ogive, a boat-tailed rear end on said tubular body portion, a closure cup with a skirt complementary to said boat-tailed end and nesting therewith and with the jacket, said jacket being turned over the base of said closure cup.

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