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J. POMEROY

2,269,475

PROJECTILE

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Fig. 1.

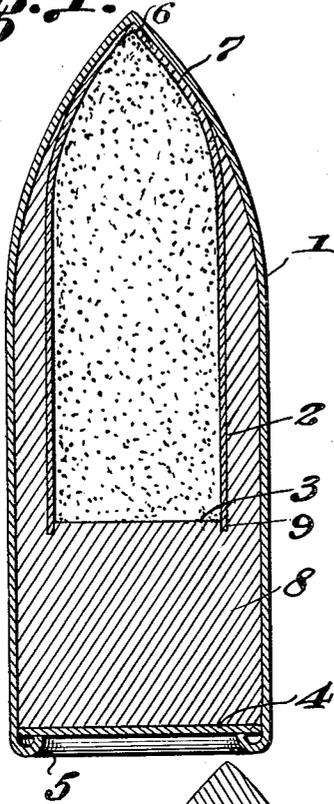


Fig. 2.

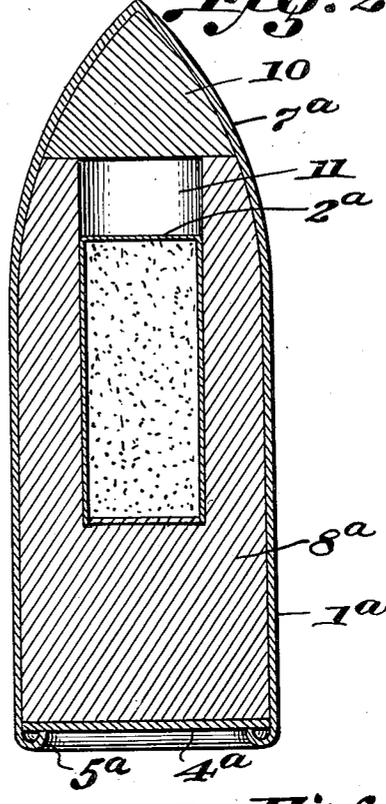


Fig. 3.

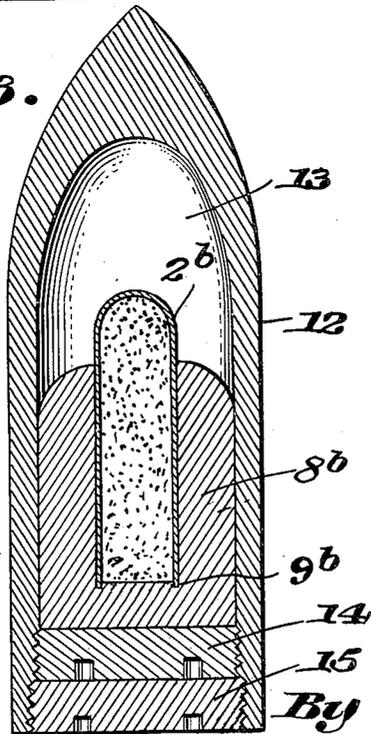
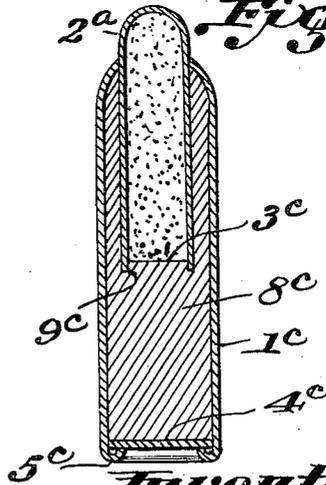


Fig. 4.



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UNITED STATES PATENT OFFICE

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PROJECTILE

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7 Claims. (Cl. 102-30)

This invention relates in general to projectiles and more particularly has reference to projectiles of the explosive or combined explosive and incendiary type.

An object of this invention is to provide a projectile for destroying war equipment, such as aeroplanes, engines, fuselage and struts and for piercing light armor plate.

Another object of this invention is to provide a projectile having a detonating charge therein placed from the impact head of the projectile that piercing of a target by the projectile will be effected prior to detonation of the charge whereby ignition of the charge will be effected through the interior of the target, rather than on the surface thereof.

A further object of this invention is to provide a projectile adapted to be projected with a high speed of rotation about its axis and having a charge therein comprising nitroglycerine admixed with a detonation reducing carrier from which the nitroglycerine will be separated by centrifugal force upon projection to increase the detonating properties of the charge.

Still another object of this invention is to provide a projectile adapted to be projected with a high speed of rotation about its axis and having a charge therein comprising nitroglycerine admixed with a detonation reducing carrier from which the nitroglycerine will be separated by centrifugal force upon projection to increase the detonating properties of the charge, said projectile also containing an incendiary charge.

It is still further object of this invention is to provide a projectile adapted to be projected with a high speed of rotation about its axis and having a charge therein comprising nitroglycerine admixed with a detonation reducing carrier from which the nitroglycerine will be separated by centrifugal force upon projection to increase the detonating properties of the charge, and a lining of lead between said projectile and the charge. With these and other important objects in view, which may be incident to my improvements, my invention resides in the parts and combinations to be hereinafter set forth and claimed, and in the understanding that the several necessary elements comprising my invention may be embodied in construction, proportions and arrangement, without departing from the spirit and scope of the appended claims.

In the drawing:

Figure 1 is a sectional view of a projectile constructed in accordance with one form of the present invention.

Fig. 2 is a similar view illustrating another form of the present invention.

Fig. 3 is a view similar to Fig. 1 illustrating still another form of the present invention.

Fig. 4 is a sectional view of a projectile in which the detonating charge container protrudes beyond the head of the projectile.

In Fig. 1 of the drawing there is shown a projectile comprising an outer casing 1 which may be formed of a cupro-nickel alloy or other suitable material. This casing is formed with a head which tapers to a point or to a small diameter in accordance with the particular purpose for which the projectile is to be used. A detonating charge container or capsule 2 of relatively thin material, such as thin copper, is provided within the interior of the projectile casing 1. The container 2 is shaped somewhat similarly to casing 1 and is mounted within said casing with its head portion nested within the head portion of said casing. This provides a considerable area of contact between the interior surface of the casing head 7 and the outer surface of the head portion 6 of the container or capsule 2. This construction insures the transmission of the impact of the head 7 of the projectile with a target to the head of the charge container 2 and the transmission to the head 6 of heat generated by frictional engagement of head 7 with a target.

As clearly shown in the drawing, a space is provided between the body portion of the casing 1 and the charge container 2. This space and the portion of the casing rearwardly of the container 2 are filled with lead.

In assembling the projectile of Fig. 1, the charge container or capsule 2 is filled with a charge and is then fitted into a bore provided in the lead plug or body 8. The lower end of the bore is provided with a peripheral annular recess into which the lower edge 9 of the wall of the container or capsule 2 is received to effectively seal the container against escape of the nitroglycerine. The exterior of the lead plug or body 8 is shaped to merge with the contour of the head 6 of the container 2 and snugly fit into the casing 1. After insertion of the lead core or plug 8 carrying the container 2 in the casing 1, a disc 4 of mica, asbestos or metal is placed thereon and the base edge 5 of the casing is turned in to retain the disc and core of lead in place.

In Fig. 2 there is shown a construction slightly different from that of Fig. 1 in that a hard war head 10 is nested in the head 7a of the outer casing 1a. This construction is more suitable

for penetrating armor. As shown in Fig. 2, the lead plug has a bore 11 in which a charge container or capsule 2a is slidably mounted. The bore 11 is longer than the container 2a to provide for displacement of the container 2 upon impact of the head against a target. Container 2a is filled with a charge and positioned in the bottom of the bore 11. The lead core 8a is then positioned in the casing 1a against the head 10 and secured in place by the disc 4a and the inturnd base edge 5a. There is sufficient friction between the container 2a and the bore 11 to retain the container in the bottom of the bore. Thus, a space is provided between the container 2a and the head 10. This space provides a time delay between the impact of the head against the target and the impact of the container 2a against said head so that the head will have penetrated the target before detonation of the charge in the container.

Another form of the present invention is shown in Fig. 3, in which the projectile comprises a shell 12 having a bore 13 therein. The bore is closed at the base of the shell by two threaded plugs 14 and 15. A lead plug or core 8b is slidably mounted in the bore 13 with sufficient friction to retain it near the base of the shell. As in the other forms of the present invention, a charge container is provided. This container 2b may be mounted in the lead plug or core 8b as in the case of Fig. 1 and protrudes from the head end of the core. The action of the construction of Fig. 3 is similar to that of Fig. 2.

Fig. 4 shows an embodiment of the present invention in the form of a highly sensitive bullet, in which the charge container is adapted to first engage the target. This construction is similar to that of Fig. 1 with the exception that the head of the casing 1c is open and the container 2c protrudes beyond the open head of the casing. This bullet may be used for big game hunting and is useful in that it will detonate against doped fabric of aeroplanes.

The projectiles or bullets of the present invention are all adapted to be projected from rifled barrels so as to impart rotation to the projectiles. This rotation is essential to the effective operation of the invention.

Each of the charge containers or capsules contains a charge of nitroglycerine admixed with an anti-detonating or detonating reducing carrier. The carrier may be kieselguhr, gelatine or any of the carriers used for making dynamite and from which the nitroglycerine may be separated by centrifugal force. With such a charge the projectile may be handled and projected from a gun with safety. While in flight the projectile rotates at high speed and the centrifugal action separates the nitroglycerine from its carrier. The free nitroglycerine may then be detonated by impact of the projectile against the target or by impact of the charge container against the head of the projectile after penetration of the target.

I have found that particularly valuable results are obtained by projecting the projectile of the present invention at a velocity of approximately 1100 feet per second from a rifled bore of such pitch as to impart a rotary speed sufficient to effect separation of the nitroglycerine from its carrier. I have found that a rotary speed of approximately 500 revolutions per second produces effective results. Higher velocities of 2200 and 2800 feet per second give very satisfactory results.

In addition to the nitroglycerine and its carrier the charge containers may carry an incendiary charge. Such incendiary charge may comprise phosphorus, cordite or other suitable inflammable material. This incendiary charge may be mixed with the detonating charge. The proportions of the detonating and incendiary charges may vary. I have found that useful mixtures may contain from $\frac{1}{3}$ to $\frac{2}{3}$ detonating charge. When the incendiary charge is to be mixed with the nitroglycerine and its carrier cordite is satisfactory as the incendiary charge. I have also found red phosphorus useful as a separate incendiary charge.

It is advisable to make the heads of the containers very thin to facilitate detonation of the charge carried therein.

The lead lining between the casing of the projectile and the charge container presents all forms of my invention serves to reduce the danger of detonation of the projectile prior to projection.

While I have shown and described the preferred embodiment of my invention, I wish it to be understood that I do not confine myself to the precise details herein set forth by way of illustration, as it is apparent that many changes and variations may be made therein by those skilled in the art, without departing from the spirit of the invention or exceeding the scope of the appended claims.

I claim:

1. A projectile adapted to be projected with rotation about its axis, comprising an outer casing having a charge container in said casing and space from the inner walls thereof, a charge of nitroglycerine admixed with a detonation reducing carrier and from which the nitroglycerine is separated by centrifugal force after projection to render it susceptible to detonation upon impact, in said container, and a lining of lead interposed between the casing and the container, the heads of said casing and container being substantially the same configuration and the head of said container being nested in the head of the said casing in contact therewith.

2. In a projectile of the character described, an outer casing of tubular form having a closed head end, the head of said projectile tapering toward the closed end thereof, a thin tubular container in said casing of a diameter less than that of the casing, said container having a closed head end having an external contour identical to the interior contour of the head of the casing, the head of said container being nested in direct contact within the head of the casing whereby shock and heat will be readily transmitted through the contacting walls of the casing and container and detonating material in said container.

3. In a projectile of the character described, an outer casing of tubular form having a closed head end, the head of said projectile tapering toward the closed end thereof, a thin tubular container in said casing of a diameter less than that of the casing, said container having a closed head end having an external contour identical to the interior contour of the head of the casing, the head of said container being nested in direct contact within the head of the casing whereby shock and heat will be readily transmitted through the contacting walls of the casing and container, a mixture of nitroglycerine and a carrier in said container, said a lead filling between the spaced walls of said container and casing.

4. In a projectile of the character described

4. In an outer casing of tubular form having a closed lead end, the head of said projectile tapering toward the closed end thereof, a thin tubular container in said casing of a diameter less than that of the casing, said container having a closed lead end having an external contour identical to the interior contour of the head of the casing, the head of said container being nested in direct contact within the head of the casing whereby shock and heat will be readily transmitted through the contacting walls of the casing and container, a mixture of nitroglycerine and a carrier in said container, and a lead filling between the spaced walls of said container and casing, said lead filling extending partly into the open end of the container to seal said open end.

5. In a projectile of the character described, an outer casing of tubular form having a closed lead end, the head of said projectile tapering toward the closed end thereof, a thin tubular container in said casing of a diameter less than that of the casing, said container having a closed lead end having an external contour identical to the interior contour of the head of the casing, the head of said container being nested in direct contact within the head of the casing whereby shock and heat will be readily transmitted through the contacting walls of the casing and

5 container, a charge of nitroglycerine in said container, and a lead body in said casing having a bore to receive said container whereby the space between the non-contacting surfaces of said container and casing will be filled with lead, the bottom of the bore of said lead body having an annular recess therein to receive the open end of said container and seal the latter.

10 6. In a projectile, an outer casing, a thin charge container positioned in the outer casing, said container having a closed forward end and a rear open end, detonating material in said container and a filling of lead in said outer casing between said casing and container, said lead extending into the open rear end of the container and sealing the latter.

15 7. In a projectile, an outer casing having an opening in its forward end, a thin detonating charge container having a closed forward and open rear end in said casing with its forward end projecting through the opening in said casing, detonating material in said container and a filling of lead in said casing between the latter and said container, said lead filling extending into the open end of the container and sealing the latter.

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