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METHOD AND APPARATUS FOR SABOT REMOVAL

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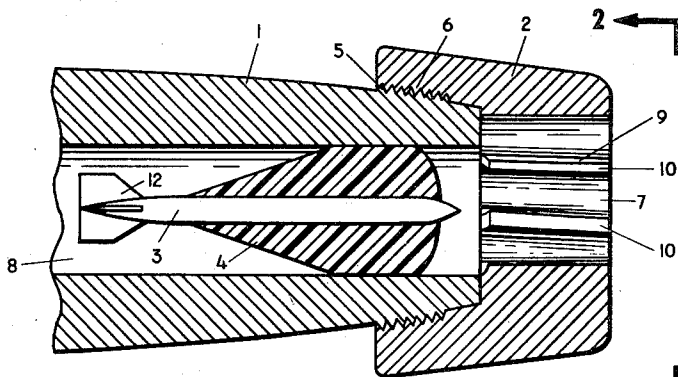


FIG. 1

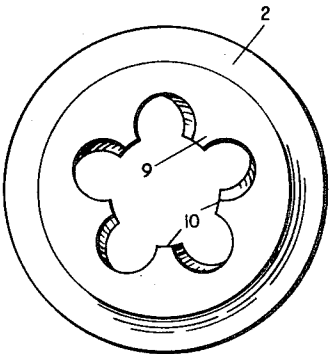


FIG. 2

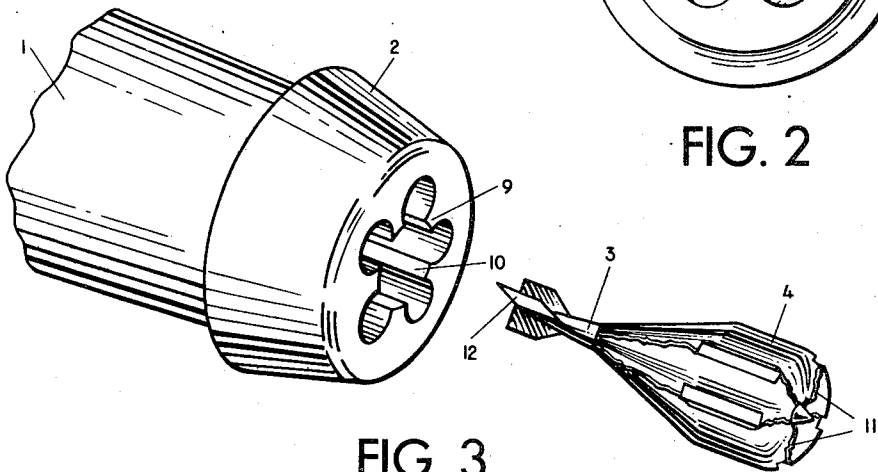


FIG. 3

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5 Claims. (Cl. 89—14)

This invention relates to a method for removing sabots from high velocity projectiles and to a sabot remover to be used in conjunction therewith. While the use of sabots to increase the velocity imparted to projectiles fired from guns is well known, removal of such a sabot from a projectile once it has left the gun barrel presents certain difficulties which the present invention is designed to overcome. Some of the prior methods have utilized explosive charges to shatter the sabot, or have utilized sabots made of several pieces, or have relied on air resistance to separate the sabot from the missile. Although each of these methods is useful, each has its limitations when applied to a particular type of projectile.

The present invention proposes the utilization of centrifugal force developed by the axial rotation of the projectile in conjunction with a device for scoring the surface of the sabot as it leaves the gun barrel, the shock of the scoring operation together with the centrifugal force developed in the sabot acting together to fracture the sabot along the scores and remove the resulting pieces by causing them to fly tangentially outward from the surface of the projectile.

It is the object of this invention, therefore, to provide a method for removing a sabot from a projectile by utilizing the velocity of the projectile and the centrifugal force developed by its axial rotation to fracture the sabot and separate it from the projectile.

It is another object of this invention to provide a device for fracturing a sabot to effect its removal from a projectile after leaving the barrel of the gun from which it is fired.

It is a further object of this invention to provide a device for simultaneously scoring the surface of a sabot carried by a projectile and imparting axial rotation thereto to effect removal of the sabot from the projectile by fracturing the sabot and causing the resulting pieces to separate from the projectile.

These and further objects of this invention will become apparent from the following description taken in conjunction with the drawing and appended claims.

In the drawing:

Figure 1 is a cross sectional view of a gun barrel equipped with the sabot remover contemplated by this invention, showing a projectile carrying a sabot just prior to its emergence from the gun barrel.

Figure 2 is a sectional view taken along line 2—2 of Figure 1 showing the arrangement of the scoring projections within the remover.

Figure 3 is a view of a projectile and sabot after passing through the remover showing the fractures caused by centrifugal force and the scoring operation.

Figure 1 shows a sectional view of a gun barrel 1 equipped with a sabot remover 2 of the type herein contemplated. A projectile 3 carrying a sabot 4 is shown just prior to passing through the remover 2. The sabot shown is of the type used for high velocity projectiles having a large mass with relation to cross-sectional area,

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the method of this invention being particularly suited for use with such projectiles and sabots, but it is to be understood that any conventional type of sabot may, by proper utilization of the method of this invention, be removed from its associated projectile.

The forward end of the gun barrel 1, as best seen in Figure 1, is provided with threads 5 which are adapted to engage the interior threads 6 in the rearward end of the remover 2. The remover, which is of generally cylindrical shape, comprises a central opening 7 which is in axial alignment with the bore 8 of gun barrel 1. A group of inwardly directed projections 9 extend radially inward from the inner wall of the opening 7 and encompass within their inner edges 10 a circumference having a somewhat smaller diameter than the outer circumference of the sabot 4.

The projections 9, as shown in Figure 2, may be conformed spirally about the axis of the opening 7. If a rifled gun barrel is used, the twist of the projections in the remover should be made the same as that of the rifling to allow the sabot to pass through without disturbing its rate of rotation. One of the advantages of this invention, however, lies in the fact that a smooth bore gun may be used, the needed axial rotation being imparted to the projectile by the spirally conformed projections in the remover simultaneously with the scoring operation.

If it is desired to utilize a smooth bore gun in conjunction with a remover having straight projections instead of the spiral form shown in the drawing, the necessary axial rotation may be imparted to the projectile by canting the stabilizing fins 12 with respect to the line of flight of the projectile.

In operation, when a projectile carrying a sabot is fired from a gun equipped with the remover of this invention, the sabot is deeply scored in passing through the remover. Because of the velocity imparted to the projectile and the sabot in the gun barrel prior to entering the remover, considerable shock is sustained by the sabot upon entry into the remover, the shock of the scoring operation and the centrifugal force developed by the axial rotation combining to fracture the sabot along the scores in a manner similar to the cracks 11 shown in Figure 3. The centrifugal force developed in the sabot by the axial rotation will then be effective to separate the pieces of the sabot from the projectile, causing the pieces to fly tangentially outward from the surface of the projectile. Thus, the projectile 3 may continue its flight with the increased velocity imparted to it by reason of the use of the sabot 4, but free from the sabot and presenting a clean aerodynamic surface and a reduced frontal area to increase its penetrating characteristics.

Each of the forms of the present invention herein disclosed provides an effective and simple method for removing a sabot from a projectile, making it unnecessary to use split sabots or explosive charges to effect a removal. The remover may be adapted for use with guns of all sizes and projectiles and sabots of various types, and is particularly suited for use with plastic and other non-metallic sabots, and sabots made of the light weight metals, although its use is not limited thereto.

It is to be understood that this invention is not restricted to the exact form depicted, and that modifications and changes may be made without departing from the scope of the invention.

I claim:

1. Means for removing a sabot from a projectile fired from a gun comprising a collar carried by the barrel of said gun at the forward end thereof, means forming an opening through said collar in axial alignment with the bore of said gun, scoring means carried within said

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opening and extending inwardly to a circumference less than the circumference of said barrel, said scoring means being spirally disposed with relation to the axis of said bore to simultaneously score said sabot and impart axial rotation thereto as said sabot passes through said collar.

2. A sabot remover adapted to fit the end of a gun barrel, said remover comprising a plurality of inwardly directed projections extending to lie on a circumference less than that of said gun barrel arranged to score and substantially weaken a sabot carried by a projectile leaving said gun barrel, said projections being spirally disposed so as to impart axial rotation to said weakened sabot and to develop centrifugal forces sufficient to fracture said sabot into a plurality of fragments and separate said fragments from said projectile.

3. A sabot remover adapted to be carried by the end of a gun barrel comprising a plurality of inwardly extending projections, the inner edges thereof lying on a circumference concentric with and smaller than the bore of said gun, and means for attaching said remover to said gun barrel.

4. A sabot remover adapted to be carried by the end of a gun barrel comprising a plurality of inwardly extending projections, the inner edges of said projections encompassing a circumference concentric with and small-

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er than the bore of said gun barrel, said projections each being spirally directed about the longitudinal axis of said gun barrel, and means for attaching said remover to said gun barrel.

5. A sabot remover carried by the muzzle end of a gun barrel comprising a cylindrical collar, a central opening formed in said collar concentric with and axially aligned with the bore of said gun barrel, a plurality of spirally conformed projections extending longitudinally along the inner surface of said opening, said projections extending inwardly to lie on a circumference less than that of said gun barrel to score and substantially weaken a sabot carried by a projectile fired from said gun barrel so that centrifugal forces engendered by rotation of said sabot about the axis of flight of said projectile will fracture said sabot, and means for attaching said remover to said gun barrel.

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