Sept. 25, 1962 H. ROSENTHAL 3,055,268

DISCARDING OBTURATOR AND ROTATOR FOR PROJECTILES

Filed Dec. 8, 1960

Fig. 1.

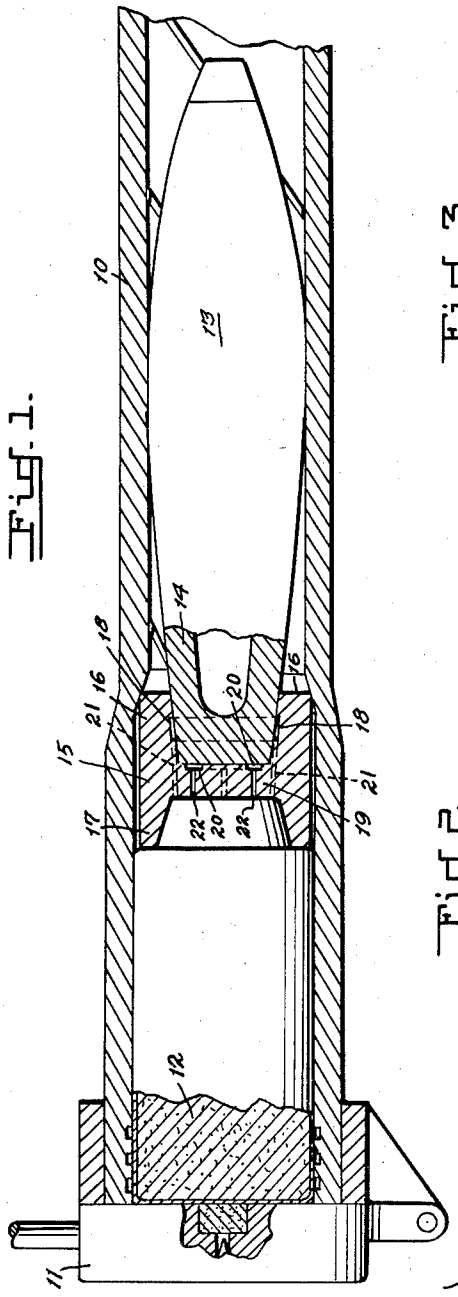


Fig. 3.

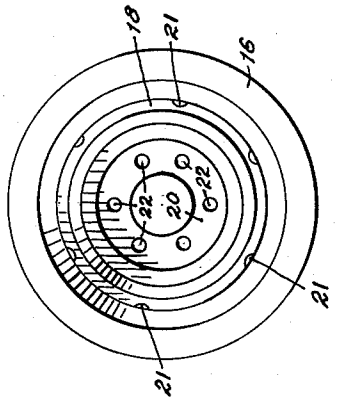
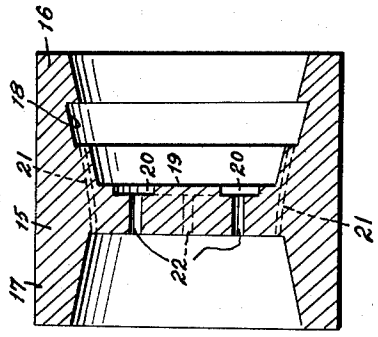


Fig. 2.



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DISCARDING OBTURATOR AND ROTATOR FOR PROJECTILES

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

This invention relates to a device for thin wall explosive projectiles for cannon and recoilless rifles that is both a rotator and an obturator.

The present trend, in the manufacture of explosive projectiles, is toward thin walls which have many obvious advantages. However where welded overlay bands are used, the thin wall of the projectile tends to yield when the band is engraving in the rifling. This means that for the conventional rotating band the base end of the projectile must be thickened so that it will be sufficiently strong under the band seat and the projectile must carry the additional weight while in flight.

Projectiles are now designed with a tapered boat tail rear section to reduce the weight and to cut down the drag while the projectile is in flight. It is therefore desirable to move the rotator and obturator further to the rear of the projectile to take advantage of the increased strength in the tapered portion. In addition, with a boat tail projectile, the rotator and obturator can more readily be discharged from the projectile immediately upon its leaving the gun barrel, so that the full flight of the projectile is made with low drag shape afforded by the boat tail.

It is therefore the object of this invention to provide a device that acts both as a rotator and as an obturator for a projectile which device is so constructed as to be discarded upon leaving the gun barrel.

In the drawing:

FIGURE 1 is a longitudinal sectional view of the gun barrel, the rotator and obturator, with a partial sectional view of the projectile;

FIGURE 2 is a separate, sectional, longitudinal view of the rotator and obturator; and

FIGURE 3 is an end view of FIGURE 2.

Referring to FIG. 1 of the drawing, **10** represents a rifled gun barrel having a breech block **11**, containing a charge **12** and a projectile **13**, having a tapered rear boat tail section **14**. Interposed between the projectile **13** and the charge **12** is an annular engraving disc of plastic or soft metal having a larger outside diameter than the projectile and the gun barrel **10** and adapted to function as both a rotator and an obturator. The disc **15** generally has a longitudinal section similar to an eye-beam as shown more particularly in FIG. 2, and is provided with peripheral flanges **16** and **17**, the inside inclination of the forward flange **16** is the same as the taper on the boat tail section **14** and is adapted to fit thereon as shown in FIG. 1. The disc **15** when fitted to the tapered boat tail section, may be lightly cemented to the projectile so as to make an airtight joint therewith. The inner periphery of the forward flange **16** is provided with an annular recess **18** which when fitted to the boat tail section **14** of the projectile becomes a closed chamber. The center section **19** of the disc **15** is also provided with an annular recess **20** on the forward face, which when fitted on the projectile also becomes a closed chamber. Vents **21** and **22** through the disc **15** are provided to connect the recesses **18** and **20** respectively with the rear side of the disc **15** and are adapted to admit the high pressure combustion gases from the charge **12** to both of the annular recesses.

The combined rotator and obturator is shown in a

separate sectional view in FIG. 2 identical with that illustrated in FIG. 1, in order to show clearly the arrangement of the annular recesses. FIG. 3 shows an end view of the device looking down the gun barrel and shows the arrangements of the vents **21** and **22** connecting the annular recesses **18** and **20** with the rear side of the disc **15**.

In operation when the charge **12** is fired the disc **15** is squeezed in the gun barrel and moves with the projectile **13** and follows the rifling of the bore to impart the desired spin to the projectile. The disc **15**, being of larger diameter than the projectile, fits the barrel tightly and contains the high pressure combustion gases of the charge **12** and permits the projectile **13** to obtain the maximum effect of the charge **12**. Thus, the disc is designed and does function, as both an obturator and a rotator.

When the charge **12** is fired, the high pressure of the combustion gases on the rear side of the disc **15** moves the projectile and also assists in maintaining the disc **15** on the projectile **13** as it moves through the gun barrel **10**. During the movement of the projectile **13** and the disc **15** through the barrel of the gun **10**, the high pressure combustion gases of the charge seep through the vents **21** and **22** to the annular recesses **18** and **20** and build up a correspondingly high pressure in these same recesses and as the projectile leaves the gun the pressure on the rear side of the disc **15** drops materially to approximately atmospheric pressure, and the difference in pressure between the high pressure in the annular recesses acting on the boat tail section of the projectile and the normal pressure on the rear side of the disc **15** causes the disc to separate from the projectile and be discarded.

The combined obturator and rotator has then performed the desired function and is discarded from the projectile which then may proceed in full flight without any excess weight and with the low drag shape afforded by the tapered boat tail section.

Having particularly described this invention, what is claimed is:

1. A gun tube, a projectile therein having a tapered boat tail rear section, an annular disc adapted to function both as an obturator and a rotator, said disc being of greater diameter than the diameter of the projectile and having a forward and a rear face, both faces being encircled by peripheral flanges forming hollowed-out portions therein, the hollowed portion of the forward face having the same inside conformation as the outside taper of the boat tail section, an annular recess in the surface of the hollow portion of the forward face of the disc, said disc secured to the boat tail section in an air-tight connection to cover and seal said annular recess, spaced vents connecting said annular recess with the hollowed portion of the rear face of the disc to admit combustion gases into said annular recess when the gun is fired, said disc after discharge from the gun being separated from the projectile by the difference in pressure between the high pressure of the combustion gases in said annular recess and the normal air pressure on the rear face of the disc.

2. The combination of a gun tube having a charge and a projectile, said projectile having a tapered boat tail rear section, an annular disc interposed between the charge and the projectile adapted to function both as an obturator and a rotator, said disc being of greater diameter than the diameter of the projectile and having a forward and a rear face, both faces being encircled by peripheral flanges forming hollowed-out portions with the shape of a truncated cone, the hollowed portion of the forward face having the same inside conformation as the outside taper of the boat tail section of the projectile, an annular recess in the interior side surface of the truncated cone shaped hollow portion of the forward face of the disc, a second annular recess in the truncated base of the hollow portion of the forward face of the disc, both of said recesses being

in planes parallel to each other and to the plane of the peripheral flanges forming the larger base of the truncated cone shaped hollow portion, said disc secured to the boat tail section in air tight connection to cover and seal both of said annular recesses, spaced vents separately connecting each annular recess with the hollowed portion of the rear face of the disc to admit combustion gases into said annular recesses when the gun is fired, said disc being separated from the projectile after discharge from the gun by the difference in pressure between the high pressure of the combustion gases in said annular recesses and the normal air pressure on the rear face of the disc.

References Cited in the file of this patent

FOREIGN PATENTS

801,987	France	May 30, 1936
865,025	France	Feb. 10, 1941