Oct. 10, 1967 J. A. NOSLER 3,345,949

BULLET

Filed Sept. 27, 1965

Fig 1

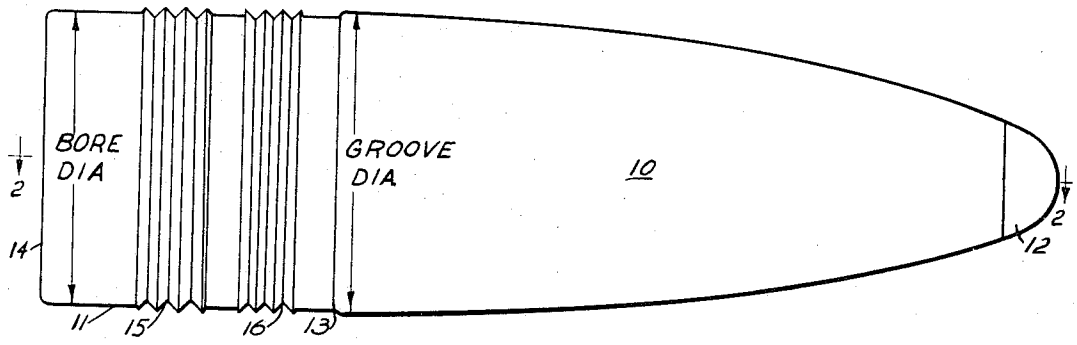


Fig 2

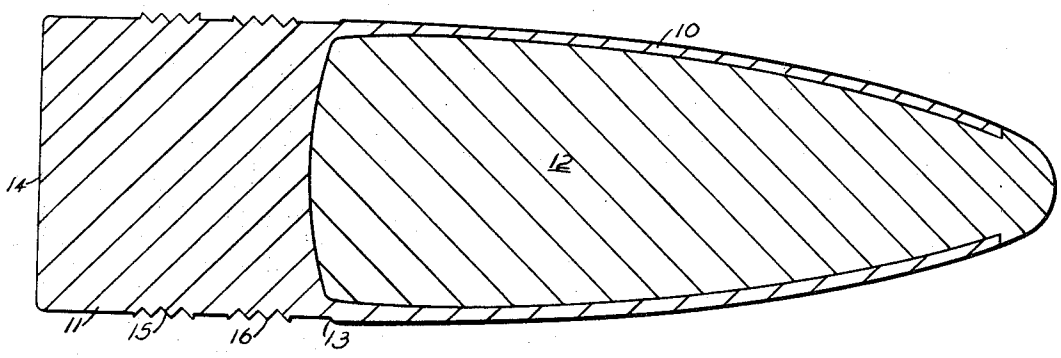
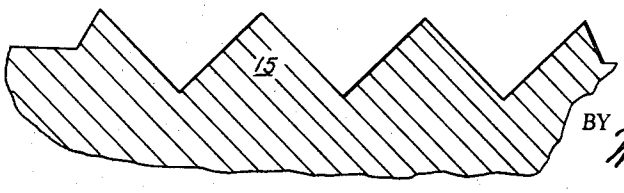


Fig 3



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United States Patent Office

3,345,949
Patented Oct. 10, 1967

3,345,949

BULLET

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Filed Sept. 27, 1965, Ser. No. 490,331
5 Claims. (Cl. 102—92.2)

ABSTRACT OF THE DISCLOSURE

A bullet having a jacket of ductile material formed with a tapered nose, a mid sectional area of groove diameter and a rear shank of bore diameter relating to the groove and bore diameters of the rifle in which it is to be used. Spaced along the shank are rolled annular grooves and ridges having a maximum diameter equal to the rifle groove diameter and a minimum diameter less than the rifle bore diameter. The grooves and ridges are spaced from the mid sectional area of the jacket and preferably are formed in two longitudinally spaced groups along the length of the shank.

This invention relates to a novel bullet.

The bullet described herein is provided with a new exterior configuration which has for its principal object an increase in accuracy and velocity. The bullet is adaptable to modern high-speed rifles, particularly magnum and super-speed 22 caliber rifles. Late improvements in 22 caliber rifles and cartridges have made this weapon suitable for hunting purposes, but conventional jacketed bullets lack the feature of controlled expansion and do not take full advantage of the velocity potential since they do not adapt to barrel configuration or the increased bullet distortion that occurs in the magnum rifle barrel.

It is a first object of this invention to provide a bullet having an exterior configuration that does adapt to barrel configuration and that utilizes the distortion of the bullet to increase the speed thereof rather than to limit it.

Another object of this invention is to provide a bullet with a minimum longitudinal contact area with the rifle barrel, the contact being spread longitudinally along the length of the bullet for greater accuracy.

Another object of this invention is to provide a bullet wherein the contact with the rifling inside the rifle barrel is created by relatively thin surface areas capable of deforming under the pressure of the impelling gases so as to seal the bullet as it expands and travels along the length of the rifle barrel.

These and further objects will be evident from a study of the enclosed drawings and from the following description. However, it is to be understood that this description is not intended to limit the scope of my invention, which is defined in the claims that follow.

In the drawings:

FIGURE 1 is a side elevation view of a bullet;

FIGURE 2 is a sectional view cut through the center of the bullet shown in FIGURE 1 along line 2—2; and

FIGURE 3 is an enlarged sectional view of a single band of grooves and ridges along the bullet shank.

The bullet used for illustration in this description is termed a 22 caliber bullet, having a nominal diameter of .224 inch. It includes a jacket **10** that is manufactured by impact extrusion from a ductile copper-zinc alloy. The shank or rear portion **11** of the jacket **10**, which is solid, is manufactured to bore diameter for the rifle barrel. The forward cavity in the jacket **10** is filled with a body of lead **12**. The mid-sectional area that joins the nose of the bullet to shank **11** is designated by the numeral **13** and has an outside diameter equal to the groove diameter of the rifle barrel.

Formed along the shank **11** in two spaced groups longitudinally displaced from both the rear end **14** of the bullet and the mid-sectional area **13**, are two bands of raised grooves and ridges designated as **15** and **16** and shown in enlarged detail in FIGURE 3. The grooves and ridges **15**, **16** are preferably rolled into the shank **11** after forming of the jacket **10**.

The bullet structure illustrated is manufactured by impact extrusion. The soft interior body of lead **12** permits the forward section of jacket **10** to expand at its target, pulling it back to the solid base provided by shank **11**. The forward wall of jacket **10** is of tapered thickness, providing the desired control of expansion, which, together with the solid deep base of shank **11**, permits retention of enough weight to give exceptionally deep penetration in game animals.

It is important to note that the shank **11**, being solid metal, is formed at bore diameter and is not forced into the grooves of the barrel rifling. It rides on top of the grooves and is perfectly piloted on the rifled lands, which are the more accurately defined elements of the inner barrel surfacing. The solid shank **11** is rolled between rollers that indent to a specific depth and force the displaced material into the roller grooves to provide a series of angular V-shaped rings and grooves around the bullet periphery. The diameter at the ridges or tops of the V-shaped rings is preferably groove diameter and the valleys are preferably less than bore diameter.

Taking a 22 caliber bullet as an example, the bullet has a groove diameter of .224 inch and a bore diameter of .219 inch. There is therefore .0025 inch difference in these diameters at each side of the bullet. To form 90 degree grooves and ridges, the rollers have a surface configuration cut .005 inch deep and .013 inch apart, i.e. from ridge to ridge or valley to valley. This produces a V-shaped configuration on the shank **11** that is .0025 inch deep relative to the illustrated bore diameter and .0025 inch above this same diameter for a total of .005 inch from bottom of valley to top of ridge. For other caliber bullets, the bore and groove relationship differs, but the bullet and forming roller grooves would be cut correspondingly wider and deeper to maintain the 90 degree angle centered about a radial plane through the bullet longitudinal axis. A 90 degree ridge and groove configuration has been found best suited to provide the strength to rotate the bullet without stripping the ridge even when used on a bore sized bullet. The 90 degree relationship is achieved by forming the groove and ridge surfaces at 45 degree angles relative to radial planes cut through the bullet.

The 90 degree relationship in the groove and ridge areas **15**, **16**, shown in FIGURE 3, has been found to provide sufficient contact with the groove diameter of the rifled bore and also to conform to the rifling readily so as to properly rotate the bullet. Other angles often create unnecessary pressure or are insufficiently strong. The described angular relationship, depth of the valleys and proportion of the ridges relative to the valley provide stability in the bullet for flight and therefore improve the accuracy of the bullet over conventional type bands used on previous bullets.

The thin outer edges of the ridges are bent slightly backwards by the forward motion of the bullet during passage through the rifle barrel. At the same time the forward pressure of the gases behind the bullet wedge these trailing edges against the wall of the barrel. This creates a gas check and promotes increased velocity. In this manner, the grooves and ridges improve the gas check without undue friction, resulting in improved velocity.

A solid base bullet as illustrated, if not reduced in diameter, would create excessive pressures. If the solid based bullet was merely reduced to bore diameter at the

solid base, the bearing surface in front of the solid base might not be sufficiently long to insure gas sealage, proper stabilization and accuracy. The two sets of valleys and ridges **15**, **16** together with the mid-sectional area **13** provide three areas of contact with the rifling of a barrel, each area being longitudinally spaced from the other. They cooperate to stabilize motion of the bullet as it passes through the rifle barrel.

The use of the circular ridges as illustrated provides a minimum amount of frictional resistance to motion of the bullet, while actually improving the sealing qualities of the bullet as it travels along the length of a rifle barrel. The distortion of the bullet occurs entirely along the valleys and ridges and the body of the bullet itself does not lengthen or distort. The bulk of the bullet shank is guided by contact with the lands on the rifling. Since these lands are generally the most accurate part of the rifle barrel, being finished by honing, the maximum accuracy in control of direction of the bullet is thereby achieved.

Various modifications could be made in the specific configuration of the bullet without deviating from my basic invention, which is defined in the following claims. Therefore, such obvious improvements are intended to be included within the scope of this disclosure.

Having thus described my invention, I claim:

1. An improvement in a bullet for firing in a rifled barrel having an inside groove diameter and reduced bore diameter, wherein the bullet is formed with an exterior jacket of ductile metal alloy, said jacket comprising:

a nose section of forwardly tapered outside diameter;

a mid-sectional area joining said nose section having an outside diameter equal to the groove diameter;

and a shank joining said mid-sectional area and extending to the rear end of the bullet, said shank having an outside diameter equal to the bore diameter and having formed thereon a series of raised annular grooves and ridges having a maximum diameter equal to the groove diameter and a minimum diameter less than the bore diameter, said grooves and ridges being longitudinally spaced from said mid-sectional area and being each oriented perpendicular to the bullet axis.

2. A bullet as defined in claim **1** wherein said grooves and ridges on said shank are formed by intersecting rolled surfaces.

3. A bullet as defined in claim **1** wherein said grooves and ridges on said shank are formed by surfaces which intersect one another at 45 degree angles relative to radial planes cut through the bullet.

4. A bullet as defined in claim **1** wherein said grooves and ridges on said shank are formed in two sets longitudinally spaced from one another and respectively spaced longitudinally from the rear end of the bullet and said mid-sectional area.

5. A bullet as defined in claim **1** wherein said grooves and ridges on said shank are formed in two sets longitudinally spaced from one another and respectively spaced longitudinally from the rear end of the bullet and said mid-sectional area;

said grooves and ridges on said shank being formed by surfaces which intersect one another at right angles and which individually form 45 degree angles relative to the radial planes cut through the bullet.

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