The present invention relates to polygonal rifling of a gun barrel to provide grooves and bores in the gun barrel separated by a flat area which tapers from the bore to the groove. There is an angle from the center of the bore to the corner of the flat area, that is, where the flat area meets the bore. The angle is predetermined by the bore dimensions.
GUN BARREL RIFLING

RELATED APPLICATIONS

This application hereby claims the benefit under 35 U.S.C. §119(e) of Provisional Application Ser. No. 61/433, 374, filed Jan. 17, 2011, entitled GUN BARREL RIFLING, which application is incorporated herein by reference in its entirety.

FIELD OF INVENTION

The present invention relates to rifling of gun barrels. More specifically, the present invention relates to rifling of gun barrels to provide a polygonal cross-sectional configuration. The invention provides for more accurate travel of a bullet, including solid copper, copper-jacketed steel core and copper-jacketed soft-core bullets.

BACKGROUND OF THE INVENTION

Rifling of gun barrels is well known in the art. Gun barrels are rifled using three known techniques namely cut rifling, button rifling and hammer forge rifling. The cross-section of the rifling may generally be described as conventional rifling providing for a cross-sectional gear shaped configuration or polygonal rifling providing for a polygonal configuration. The present invention relates to polygonal rifling.

The prior art discloses polygonal rifling such as disclosed in U.S. Pat. No. 3,643,364 (“the ‘364 patent”) directed to a rifled gun barrel with the interior cross-sectional configuration defining a regular curvilinear polygon. The disclosure of the ‘364 patent incorporates in its entirety herein by reference. The ‘364 patent discloses a three arc radius providing for a polygonal shape having a blended radius from the groove to the flattened portion to adjacent groove. A problem with this configuration is in the blended radius. When the bullet rotates on its helix angle as it passes through the barrel, the bullet jacket will be deformed and become non-symmetrical. This causes the center of gravity of the bullet to move off center and the barrel may not travel as straight as a bullet with a center of gravity more on center.

The prior art rifling while useful has various shortcomings and improvement to barrel rifling is desirable to provide for more accurate tracking of bullets. The rifling techniques of the present invention provide such improvement.

SUMMARY OF INVENTION

A primary object of the present invention is to provide an improved polygonal rifling for a gun barrel. The invention allows the bullet to fly straighter and track more accurately.

The rifling of the present invention precludes any substantial deformation of the bullet jacket with minimal engraving and in particular in copper jacket bullets. The rifling, therefore, allows the bullet to move more symmetrically along the barrel and, therefore, the bullet will track more accurately to the target.

The rifling of the present invention provides additional improvement over the prior art as it includes no sharp corners of the lands. In this application, the area between the grooves will be referred to as the “bore” area or “bores,” which area is also sometimes referred to in the art as the “lands.”

The rifling of the present invention generally provides a tight seal around the bullet when the bullet enters the rifling in the barrel and has no sharp corners which will deform the bullet jacket and change the center of gravity of the bullet.

The invention is, therefore, directed to a gun barrel having polygonal rifling comprising helically disposed rifling grooves in a barrel bore and having a flat area between the grooves and the bore. The flat area includes corner areas. The groove diameter is greater than the bore diameter and the flat area dimensions which connects the groove diameter and the bore diameter is less than the bore diameter.

These primary and other objects of the invention will be apparent from the following description of the preferred embodiments of the invention and from the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 discloses a cross-section of a rifle barrel showing the rifling at section B;

FIG. 2 is a detailed cross-section of the rifling of section B of FIG. 1 illustrating the grooves and bore of the rifling with flat areas therebetween;

FIG. 3 is a further detailed cross-section of FIG. 1 similar to FIG. 2 illustrating the polygonal rifling of the invention;

FIG. 4 is an enlarged view of section C of FIG. 3 illustrating the rifling of the invention;

FIG. 5 is a detailed cross-section of the rifling of section B of FIG. 1 illustrating the grooves and bore of the rifling with flat areas therebetween;

FIG. 6 is a sectional view of a gun barrel with the rifling of the invention; and

FIG. 7 is an enlarged view of section 7 of FIG. 6 illustrating the breech end of the gun barrel and the polygonal rifling of the invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The present invention is disclosed in Figs. 1-7 and relates to polygonal rifling of a gun barrel to provide grooves and bores in the gun barrel separated by a flat area which tapers from the bore to the groove. There is an angle from the center of the bore to the corner of the flat area, that is, where the flat area meets the bore. The angle is predetermined by the bore dimensions, i.e. the deeper the groove, the difference in the angle.

The polygonal rifling of the present invention may be made by known rifling techniques including cut rifling, button rifling and hammer forge rifling.

Referring to FIG. 1, FIG. 1 discloses a cross-sectional view of a gun barrel 10. Section B of FIG. 1 illustrates the polygonal rifling of the invention and is shown in greater detail in Figs. 2-5 and 7. The helix of the rifling providing a twist in the rifled barrel is substantially uniform from the breech end of the barrel to the muzzle end of the barrel.

Referring to FIGS. 2 and 5, these Figures disclose a cross-section of barrel 10 having polygonal rifling including a bore diameter BD2, a groove diameter GD1 and flat area 14 joining grooves 13 and bores 12. Flat area 14 tapers from bore 12 to groove 13. The dimension of the flat area 14 (FD3) is less than the area of bore 12. As shown in FIGS. 2 and 5, there
are six grooves and six bores. However, the number of grooves and bores may vary depending on the type of gun barrel.

Again referring to FIGS. 2 and 5, GD1 shows the groove diameter; BD2 shows the bore diameter; LD3 shows the flat dimension; and LD4/FD3 shows the angle from the flat area 14 to the groove diameter. The LD4 dimension is equal to or less than the bore diameter. In a preferred embodiment, the groove diameter GD1 is 0.224 inches; the bore diameter BD2 is 0.219 inches; and the flat diameter LD3 is 0.215 inches. The flat dimension LD3 is always smaller than the bore diameter BD3.

Referred to FIGS. 3 and 4, there is shown a further detailed view of the polygonal rifling of the invention. Specifically, numeral 12 illustrates the bore area; numeral 13 illustrates the groove area; numeral 14 illustrates the flat area joining the groove area and bore area and providing the polygonal shape of the barrel rifling. Numerals 15 shows a line coming from one groove 13 across the flat area 14 across bore 12 to the next groove 13 illustrating the creation of two flat areas per bore. Number 16 illustrates a line showing the angle from the center of the bore area 12 to the corner of the flat area 14, that is, where the flat meets the bore. The angle in one preferred embodiment of the invention having a bore diameter of 0.219 inches and a groove diameter of 0.224 inches provides for an angle of about 4.7 degrees. As set forth above, the angle is predetermined by the groove and bore dimensions, e.g., a deeper groove will provide a larger angle. The length of the flat area 14 is determined by the bore diameter.

Referring to FIGS. 6 and 7, FIG. 6 shows a cross-section of the gun barrel with the breech end at section 7. FIG. 7 shows an enlarged view of FIG. 6 and the breech end of the barrel. Numeral 20 illustrates the body of the chamber for receiving the bullet, and numeral 21 illustrates the tapered throat of the chamber that leads into the rifling. The polygonal rifling of the invention is shown in cross-section; that is grooves 13, bores 12 and flat areas 14.

With the rifling of the present invention, the bullet gets pushed into the rifling at the throat of the chamber and centers up in the bore. As the bullet is pushed through the barrel at high velocities, with a right hand twist the left side will have a wind up effect and the stress at that corner where the groove meets the bore will not deform the bullet due to the corners of the flat area between the bore and groove. This is different from the polygonal rifling of the '364 patent wherein the bullet may rotate somewhat when placed in the bore due to the blended radius. When the bullet is fired from the rifle using the rifling of the present invention, the bullet follows the helix angle, e.g. twist rate of the rifling, and the stress from the wind up effect of the bullet on the corners of the polygonal shape creates no or little bullet deformation and provides for more accurate tracking of the bullet when leaving the barrel.

The exemplary embodiments herein disclosed are not intended to be exhaustive or to unnecessarily limit the scope of the invention. The exemplary embodiments were chosen and described in order to explain the principles of the present invention so that others skilled in the art may practice the invention. As will be apparent to one skilled in the art, various modifications can be made within the scope of the aforesaid description. Such modifications being within the ability of one skilled in the art form a part of the present invention and are embraced by the appended claims.

It is claimed:

1. A gun barrel having polygonal rifling comprising helically disposed rifling grooves in a barrel bore and having a flat area between said grooves and said bore, said flat area including corner areas, wherein the groove diameter is greater than the bore diameter and the flat area dimensions which connects the groove diameter and the bore diameter is less than the bore diameter.

2. A gun barrel according to claim 1 wherein there are six grooves and six bores.

3. A gun barrel according to claim 2 wherein the groove diameter is about 0.224 inches, the bore diameter is about 0.219 inches and the flat diameter is about 0.215 inches.

4. A gun barrel according to claim 3 wherein an angle from the center of the bore area to the corner of the flat area is about 4.7 degrees.

5. A gun barrel according to claim 1 wherein the rifling provides a twist in the rifled barrel which is substantially uniform from the breech end of the barrel to the muzzle end of the barrel.

6. A gun barrel according to claim 1 wherein a bullet fired through the barrel will not have any substantial deformation due to the corners of the flat area between the bore and groove.

7. A gun barrel according to claim 1 wherein a bullet fired through the barrel follows the helix angle of the rifling and the stress from the wind up effect of the bullet of the corners of the polygonal shape creates substantially no or little bullet deformation.

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