US 20120180625A1

(19) **United States**

(12) **Patent Application Publication**

Gazayerli

(10) **Pub. No.: US 2012/0180625 A1**

(43) **Pub. Date: Jul. 19, 2012**

(54) **ORDNANCE**

(76) Inventor: **Mohamed Mounir Gazayerli**, Bloomfield Hills, MI (US)

(21) Appl. No.: **13/040,377**

(22) Filed: **Mar. 4, 2011**

Related U.S. Application Data

(60) Provisional application No. 61/310,749, filed on Mar. 5, 2010.

Publication Classification

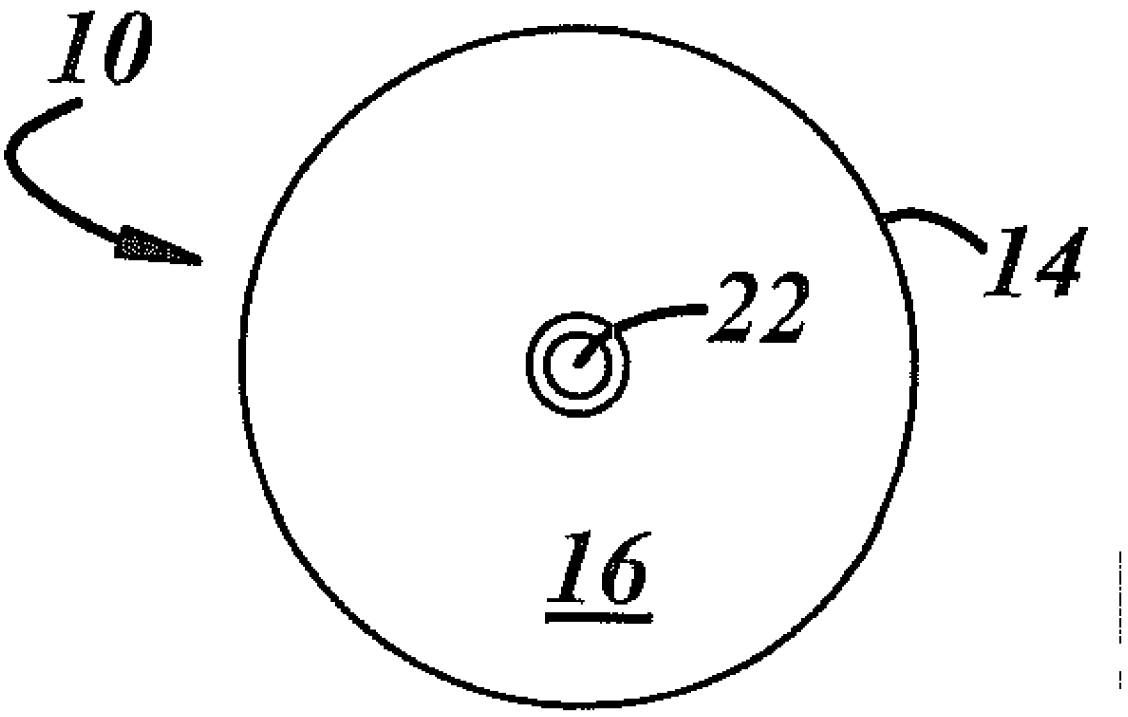
(51) **Int. Cl.**

F41A 21/16	(2006.01)
F42B 10/00	(2006.01)
F42B 5/02	(2006.01)
F42B 12/02	(2006.01)

(52) **U.S. Cl.** **89/14.7**; 102/501; 102/439; 42/78

(57) **ABSTRACT**

A boomerang-shaped projectile, ammunition cartridge including the projectile, and a weapon barrel through which the projectile is fired.



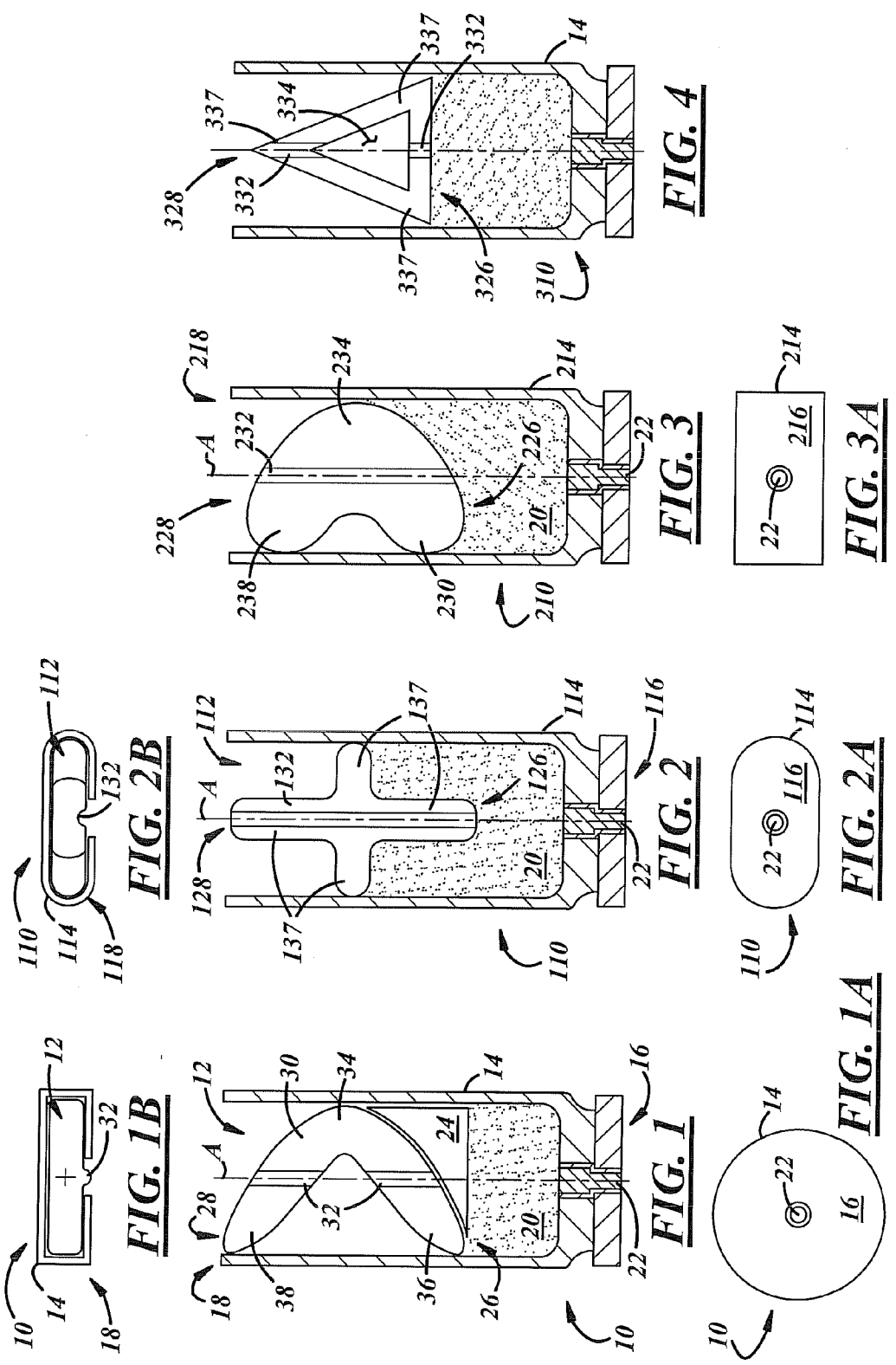


FIG. 1B
FIG. 2B
FIG. 1
FIG. 2
FIG. 1A
FIG. 2A
FIG. 3
FIG. 3A
FIG. 4

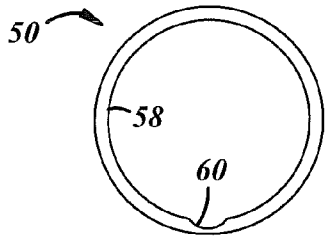


FIG. 6

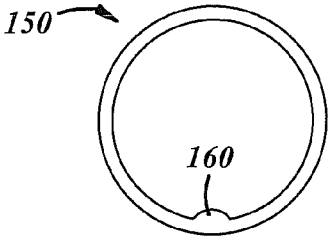


FIG. 6A

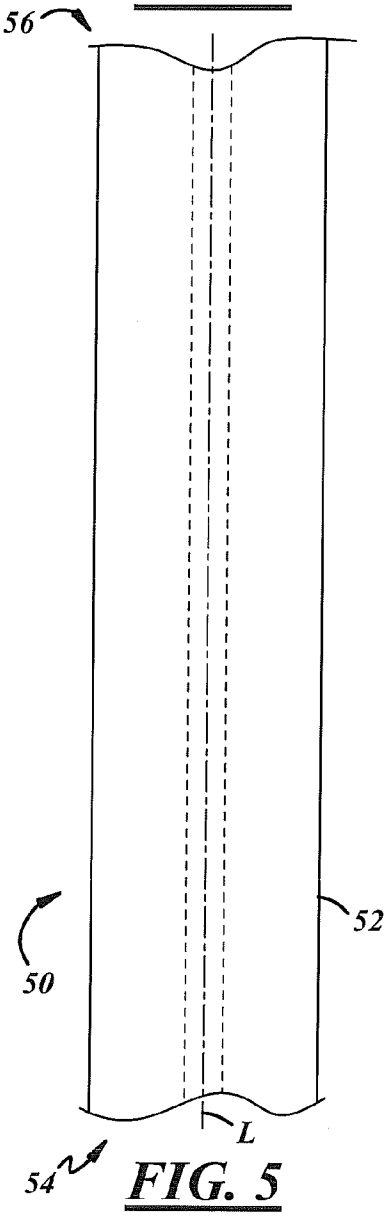


FIG. 5

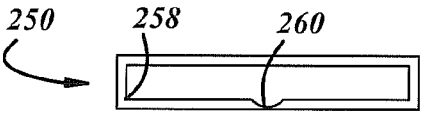


FIG. 7

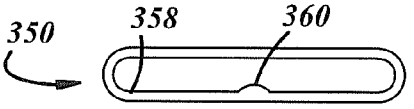


FIG. 7A

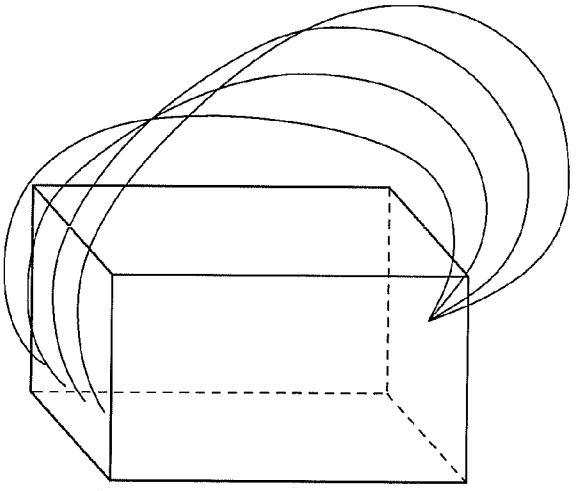


FIG. 10

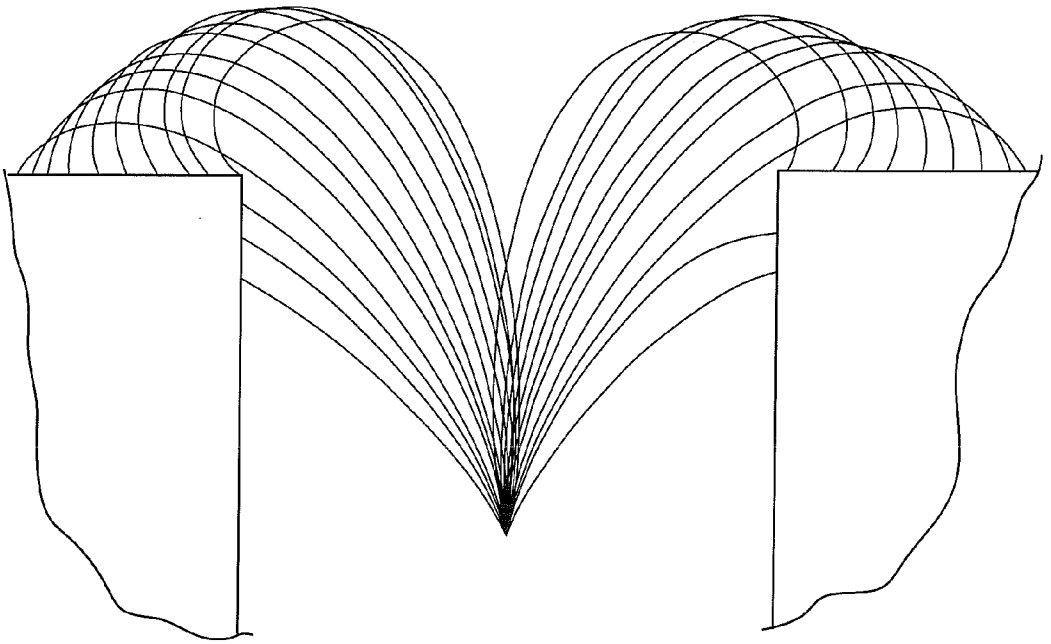


FIG. 8

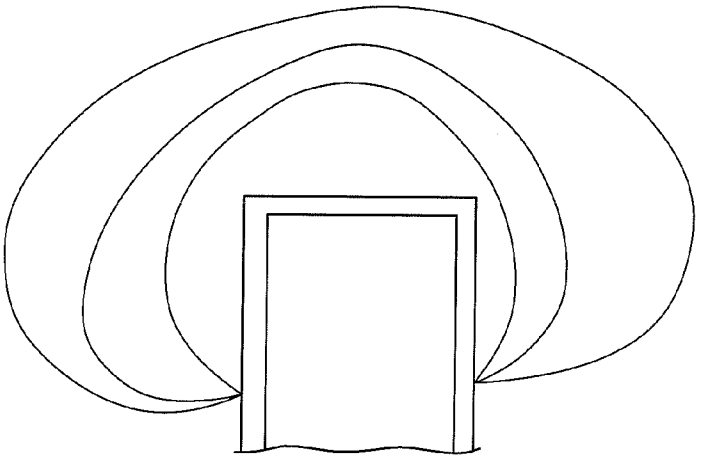


FIG. 9

ORDNANCE

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application claims the benefit of U.S. Provisional Application No. 61/310,749, filed Mar. 5, 2010.

[0002] The content of the above application is incorporated herein by reference in its entirety.

TECHNICAL FIELD

[0003] This disclosure relates generally to ordnance and, more particularly, to ballistic ordnance including ballistic weapons and ammunition.

BACKGROUND

[0004] A ballistic weapon typically fires ballistic ammunition in a straight line subject to ballistic conditions, like gravity and wind. Projectiles of ballistic ammunition are generally spherical or cylindrical and, when fired from a weapon, travel in a generally straight line subject to ballistic conditions. Although such ballistic ordnance is effective for conventional battlefield operations, it is not always well suited for modern urban firefights.

[0005] Urban firefights usually involve engaging enemy combatants positioned around corners of buildings, on roofs of buildings, on opposite sides of buildings, and the like. It is difficult to shoot enemy combatants when they are so positioned, and use of airstrikes or use of other ordnance such as grenades are not always suitable alternatives.

BRIEF SUMMARY

[0006] One exemplary embodiment of a projectile for a gun includes a boomerang-shaped body having a longitudinal axis, longitudinally opposite end portions, and an external surface having an alignment feature extending parallel to the longitudinal axis between said end portions.

[0007] In accordance with another exemplary embodiment, there is provided an ammunition cartridge comprising the projectile recited above.

[0008] In accordance with an additional exemplary embodiment, there is provided a weapon barrel through which a boomerang-shaped projectile is fired, said barrel comprising an elongated hollow body having a longitudinal axis, a breech end, and a muzzle end longitudinally opposite said breech end, a bore extending through said body from said breech end to said muzzle end, and an alignment feature in at least a portion of said bore and extending parallel to the longitudinal axis between said ends for orienting said projectile.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] Features and advantages of one or more of the disclosed embodiments of this disclosure will be apparent to those of ordinary skill in the art from the following detailed description of exemplary embodiments and the claims, with reference to the accompanying drawings in which:

[0010] FIG. **1** is a fragmentary schematic view of exemplary embodiment of a cartridge including an exemplary embodiment of a boomerang-shaped projectile;

[0011] FIG. **1**A is a rearward end view of the cartridge of FIG. **1**;

[0012] FIG. **1**B is a forward end view of the cartridge of FIG. **1**;

[0013] FIG. **2** is a fragmentary schematic view of a second exemplary embodiment of a cartridge including a second exemplary embodiment of a boomerang-shaped projectile;

[0014] FIG. **2**A is a rearward end view of the cartridge of FIG. **2**;

[0015] FIG. **2**B is a forward end view of the cartridge of FIG. **2**;

[0016] FIG. **3** is a fragmentary schematic view of a third exemplary embodiment of a cartridge including a third exemplary embodiment of a boomerang-shaped projectile;

[0017] FIG. **3**A is a rearward end view of the cartridge of FIG. **3**;

[0018] FIG. **4** is a fragmentary schematic view of a fourth exemplary embodiment of a cartridge including a fourth exemplary embodiment of a boomerang-shaped projectile;

[0019] FIG. **5** is a plan view of an exemplary embodiment of a weapon barrel;

[0020] FIG. **6** is a cross-sectional view of the weapon barrel of FIG. **5**;

[0021] FIG. **6**A is an alternative cross-sectional view of the weapon barrel of FIG. **5**;

[0022] FIGS. **7** and **7**A are other alternative cross-sectional views of the weapon barrel of FIG. **5**;

[0023] FIG. **8** is a diagram of exemplary flight paths of boomerang-shaped projectiles around opposite corners of adjacent buildings;

[0024] FIG. **9** is a diagram of exemplary flight paths of boomerang-shaped projectiles over a building; and

[0025] FIG. **10** is a diagram of additional exemplary flight paths of boomerang-shaped projectiles over a building.

DETAILED DESCRIPTION

[0026] In general, ballistic ordnance will be described using one or more examples of exemplary embodiments of ballistic projectiles and related weapons that include features to allow projectiles to be fired according to boomerang-like flight paths. The example embodiments will be described with reference to use in firearms. However, it will be appreciated as the description proceeds that the invention is useful in many different applications and may be implemented in many other embodiments. In this regard, and as used herein and in the claims, it will be understood that the term projectile and weapon refers not only to firearm applications, but also to other ordnance applications.

[0027] Referring specifically to the drawings, FIG. **1** illustrates an exemplary embodiment of a cartridge **10** including a projectile **12**, a case **14** having a rearward end **16** and a forward end **18**, a propellant **20** disposed in the case **14** between the projectile **12** and the rearward end **16** of the case **14**, and a cap or primer **22** carried by the case **14** between the propellant **20** and the rearward end **16** of the case **14**. The cartridge **10** also may include a wad **24** disposed between the projectile **12** and the propellant **20** to support the projectile **12** and/or to distribute explosive force of the propellant **20** to the projectile **12**.

[0028] The cartridge **10** may be of any suitable caliber and any suitable type. Likewise, the propellant **20**, primer **22**, and wad **24** may be of any suitable type. Although the case **14** may be generally similar to conventional cases at the rearward end **16**, the rest of the case **14** may be adapted to the shape of the projectile **12**.

[0029] Unlike conventional projectiles, which are round or generally cylindrical, the projectile **12** is boomerang-shaped. As used herein, the terminology "boomerang-shaped" includes any shape suitable to cause a projectile to have a flight path that is curved, and to have a rotational axis of constantly changing orientation, for example, according to gyroscopic precession.

[0030] The projectile **12** has a longitudinal axis A, longitudinally opposite rearward and forward end portions **26**, **28**, and an external surface **30** having one or more alignment features **32** extending parallel to the longitudinal axis A between the end portions **26**, **28**. If a plurality of alignment features **32** are used, they may be spaced apart and parallel to one another. The projectile **12** may extend beyond the forward end **18** of the case **14**, or may be generally contained within the case **14** as shown with an open ended aperture in the case **14** corresponding to the alignment feature **32**.

[0031] In this first embodiment, the projectile **12** is V-shaped with a central portion **34** and two lobes **36**, **38** extending therefrom according to the classic and familiar boomerang design. Accordingly, the alignment feature **32** is interrupted by a space between the lobes. The projectile **12** may be weighted asymmetrically about the longitudinal axis A. For example, the projectile **12** may have a greater weight on one side of the longitudinal axis A than on the opposite side of the longitudinal axis. Also, the projectile **12** may be weighted heavier at one longitudinal end than at the other. Furthermore, a mild rifling of a corresponding weapon barrel throughout the length of barrel or only at the muzzle end may be used to initiate rotation of the projectile **12**.

[0032] In the illustrated embodiment, the rearward end **16** of the case **14** may be round or cylindrical as shown in FIG. **1**A, and other portions of the case **14** may be shaped to accommodate the boomerang-shape of the projectile **12**. For example, the forward end **18** of the case **14** may be generally rectangular in shape as shown in FIG. **1**B. As also shown in FIG. **1**B, a portion of the case **14** may be notched to form an opening for the alignment feature **32**. Portions of the case **14** between the forward and rearward ends also may be generally rectangular or may have a gradual transition shape from the forward end **18** to the rearward end **16**.

[0033] FIGS. **2** through **4** illustrate other exemplary embodiments of projectiles. These embodiments are similar in many respects to one another ant to the embodiment of FIGS. **1**-**1**B, and like numerals between the embodiments generally designate like or corresponding elements throughout the several views of the drawing figures. Additionally, the descriptions of the embodiments are incorporated by reference into one another and the common subject matter generally may not be repeated here.

[0034] Referring to FIG. **2**, a cartridge **110** includes a projectile **112** with a longitudinal axis A, longitudinally opposite rearward and forward end portions **126**, **128**, and an external surface **130** having an alignment feature **132** extending parallel to the longitudinal axis A between the end portions **126**, **128**. In this second embodiment, the projectile **112** is cross-shaped with four lobes **137** and a central portion **134**. The alignment feature **132** may be provided from end to end across the central portion **134** and may be a recess as shown.

[0035] In the illustrated embodiment, a rearward end **116** of a case **114** may be elliptical as shown in FIG. **2**A, and other portions of the case **114** may be shaped to accommodate the boomerang-shape of the projectile **112**. As used herein, the term elliptical includes ellipse-shaped, oval, or rounded rectangular shaped. For example, a forward end **118** of the case **114** may be generally elliptical in shape as shown in FIG. **2**B. As also shown in FIG. **2**B, a portion of the case **114** may be notched to form an opening for the alignment feature **132**. Portions of the case **114** between the forward and rearward ends also may be generally elliptical or may have a gradual transition shape from the forward end **118** to the rearward end **116**.

[0036] Referring to FIG. **3**, a cartridge **210** includes a projectile **212** having a longitudinal axis A, longitudinally opposite rearward and forward end portions **226**, **228**, and an external surface **230** having an alignment feature **232** extending parallel to the longitudinal axis A between the end portions **226**, **228**. In this third embodiment, the projectile **212** is bean-shaped with two lobes **236**, **238** and a central portion **234**. The alignment feature **232** may be provided along the central portion **234**.

[0037] In the illustrated embodiment, a rearward end **216** of a case **214** may be rectangular as shown in FIG. **3**A, and other portions of the case **214** may be shaped to accommodate the boomerang-shape of the projectile **212**. The case **214** may be rectangular shaped at its forward end **218** like the embodiment of FIG. **1**B, or may be elliptical shaped like the embodiment of FIG. **2**B.

[0038] Referring to FIG. **4**, a cartridge **310** includes a projectile **312** having a longitudinal axis A, longitudinally opposite rearward and forward end portions **326**, **228**, and an external surface **330** having an alignment feature **332** extending parallel to the longitudinal axis A between the end portions **326**, **328**. In this fourth embodiment, the projectile **312** is triangle or delta-shaped with three lobes **337** and an open central portion **334**. The alignment feature **332** may be provided from end to end and may be interrupted by the central portion **334**.

[0039] FIG. **5** illustrates an exemplary embodiment of a weapon barrel **50**. The barrel **50** includes an elongated hollow body **52** having a longitudinal axis L, a breech end **54**, and a muzzle end **56** longitudinally opposite the breech end **54**. As also shown in FIG. **6**, the barrel **50** also includes a bore **58** extending through the body **52** from end to end, and an alignment feature **60** in at least a portion of the bore **58** and extending parallel to the longitudinal axis L between the ends. The alignment feature **60** cooperates with a corresponding alignment feature on a projectile that is fired through the barrel **50**. The corresponding alignment features of the barrel and projectile maintain the projectile in a straight line for at least a portion of its travel through the barrel. In the illustrated embodiment, the alignment feature **60** is a longitudinally extending groove or recess that may be rounded as shown.

[0040] In another embodiment, shown in FIG. **6**A, a barrel **150** may include an alignment feature **160** that may be a longitudinally extending projection or ridge that may cooperate with a longitudinally extending recess or groove of a corresponding projectile.

[0041] FIG. **7** illustrates an alternative embodiment of a weapon barrel **250** with a bore **258** having a generally rectangular shape with an alignment feature **260**. FIG. **7**A illustrates another alternative embodiment of a weapon barrel **350** with a bore **358** having a generally elliptical shape with an alignment feature **360**.

[0042] In general, the components of the disclosed cartridges and weapon barrels may be manufactured and assembled according to techniques known to those skilled in the art, including casting, forging, molding, machining,

stamping, and/or the like. Likewise, any suitable materials can be used in making the components, such as metals, composites, polymeric materials, and/or the like.

[0043] However, the weapon barrels disclosed herein may be initially produced as generally cylindrical or tubular components and then may be formed into suitable cross-sectional shapes according to the projectiles and/or the cases. For instance, although not shown, a mandrel may be inserted into a cylindrical bore of a barrel and then the barrel may be pressed or otherwise formed to conform the bore to the mandrel into the desired shape that corresponds with the projectile and/or case.

[0044] One or more of the features of the exemplary embodiments described above, may provide one or more of the following benefits. Enemy combatants may be shot with a projectile from a weapon even though they are not in a direct line of fire from the weapon, for example, when they are positioned around corners of buildings, on roofs of buildings, on opposite sides of buildings, and the like. Moreover, the presently disclosed ordnance would confuse enemy combatants as to the origin of projectile firing. In other words, the origin of the projectile firing would be effectively disguised.

[0045] For example, FIG. **8** illustrates various flight paths that the presently disclosed projectiles may take when the presently disclosed weapon barrel is used to fire the presently disclosed projectiles so as to shoot an enemy combatant hiding around a corner of a building. Of course, the weapon or just the barrel may be inverted so that the weapon can fire a projectile around an oppositely disposed corner of an adjacent building. The illustrated exemplary flight paths may be generally elliptical as shown, or circular, or of any other boomerang flight path shape.

[0046] In another example, FIG. **9** illustrates various flight paths that the presently disclosed projectiles may take when the presently disclosed weapon barrel is used to fire the presently disclosed projectiles so as to shoot an enemy combatant hiding on a side of a building opposite that of the weapon. Accordingly, the flight paths are over the building. Of course, the flight paths may also strike an enemy combatant on top of the building. A similar example is depicted in FIG. **10**, which shows flight paths resulting from moving a barrel from side to side or up and down.

[0047] Finally, the foregoing description is not a definition of the invention, but is a description of one or more examples of exemplary embodiments of the invention. The statements contained in the foregoing description relate to the particular examples and are not to be construed as limitations on the scope of the invention as claimed below or on the definition of terminology used in the claims, except where terminology is expressly defined above. And although the present invention has been disclosed using a limited number of examples, many other examples are possible and it is not intended herein to mention all of the possible manifestations of the invention. In fact, other modifications, variations, forms, ramifications, substitutions, and/or equivalents will become apparent to those skilled in the art in view of the foregoing description. The present invention is intended to embrace such forms, ramifications, modifications, variations, substitutions, and/or equivalents as fall within the spirit and broad scope of the following claims. In other words, the present invention encompasses many substitutions or equivalents of limitations recited in the following claims. For example, the materials, sizes, and shapes, described above could be readily modified or substituted with other similar materials, sizes, shapes, and/or the like. Therefore, the invention is not limited to the particular examples of exemplary embodiments disclosed herein, but instead is defined solely by the claims below.

1. A projectile for a gun, said projectile comprising a boomerang-shaped body having a longitudinal axis, longitudinally opposite end portions, and an external surface having an alignment feature extending parallel to the longitudinal axis between said end portions.

2. The projectile set forth in claim **1**, wherein said alignment feature is a longitudinally extending groove.

3. The projectile set forth in claim **1**, wherein said alignment feature is a longitudinally extending ridge.

4. The projectile set forth in claim **1**, wherein said body is V-shaped with two lobes.

5. The projectile set forth in claim **1**, wherein said body is cross-shaped with four lobes.

6. The projectile set forth in claim **1**, wherein said body is bean-shaped with two lobes.

7. The projectile set forth in claim **1**, wherein said body is delta-shaped with three lobes.

8. An ammunition cartridge comprising the projectile set forth in claim **1**.

9. The ammunition cartridge set forth in claim **6**, further comprising:

a case carrying the projectile and having a rearward end and a forward end;

a propellant disposed in said case between said projectile and said rearward end of said case; and

a primer carried by said case between said propellant and said rearward end of said case.

10. The ammunition cartridge set forth in claim **7**, further comprising a wad disposed between said projectile and said propellant.

11. A weapon barrel through which a boomerang-shaped projectile is fired, said barrel comprising an elongated hollow body having a longitudinal axis, a breech end, and a muzzle end longitudinally opposite said breech end, a bore extending through said body from said breech end to said muzzle end, and an alignment feature in at least a portion of said bore and extending parallel to the longitudinal axis between said ends for orienting said projectile.

12. A handgun comprising the weapon barrel set forth in claim **11**.

13. A rifle comprising the weapon barrel set forth in claim **11**.

14. An automatic firearm comprising the weapon barrel set forth in claim **11**.

* * * * *