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(54) **The uniform rectilinear gun (URG)**

(57) This invention is a precision weapon that utilises solely, as a projectile, a precision-ball made out of a suitable material or a combination of these materials. It employs a smoothbore precision-barrel with a metal toothed rack/rail affixed along the northern hemisphere of the muzzle of the barrel that effectively converts some of the forward motion of the ball into rotational motion so that the ball is mechanically forced to rotate backwards at very high speed that can run into millions of rotations per minute vastly improving it's ballistic coefficient and down-range accuracy. The weapon can be produced in a variety of existing types of firearms and can be chambered for a variety of calibers. A 6,35mm caliber bolt-action rim-fire weapon for instance will provide a user with a weapon ideal for hunting small-game or for target shooting purposes. See figures 1, 2 and 3.and 4.

EP 2 947 413 A1

Description

The background art

[0001] The field to which the invention pertains is small-arms, firearms and airguns in particular and projectile-discarding weapons on a much broader scale.

Disclosure of the invention

[0002] The quest for a projectile-discharging weapon with an even flatter trajectory is ongoing and relentless.yet so far all projectiles utilised are "passive" by nature, for they simply push aside air molecules as they travel through the air. As such they are usually rather pointed and elongated for a better ballistic coefficient and require gyroscopic rotation to maintain stability in flight. The backward/upward spinning precision ball is the only "dynamic" projectile for as it travels through the air, it attempts to defeat/mitigate pressure drag by actively transferring air molecules piling up in front of it, to its rear. Moreover, since the its rotational speed is also a product of its forward velocity, the rate at which it does this work is directly proportional to its forward velocity and inversely proportional to its diameter. A precision ball made of a material of a dense material such as a metal, and travelling forward at a given velocity x while spinning backwards/upwards at the same velocity x, or very close to this velocity, will benefit from a high ballistic coefficient and a flat trajectory, so far unprecedented amongst weapons of this genre. The precision-ball also represents a straightforward, economical and uniform projectile that can achieve high kinetic energy transfer levels once it impacts a target, especially if it employs a core.

[0003] This invention is a high-precision, high-accuracy weapon that utilises solely as a projectile, a precision ball made out of solid free machining brass, bronze or gilding metal or other suitable material or a combination of these materials. The precision ball may also me manufactured with a core. For instance a precision ball with a copper jacket (11) and a core (12) made of a solid tungsten carbide will constutute a projectile of high sectional density and exceptional penetrative capabilities, while a precision ball with a hollow core or a core made out of a tungsten paste or a copper paste will retain the density of a solid ball yet flatten on impact, hence exhibiting outstanding energy transfer capabilities.

[0004] A ball discharged from the weapon is mechanically forced to rotate upwards/backwards at very high speeds that can run into millions of rotations per minute. The forward and backward/upward spinning motion also combine to create high pressure beneath the ball significantly mitigating its drop rate over distance to the effect that its trajectory is expected to be completley flat over a distance that can be expressed as a proportion of its muzzle velocity. This means that a user need not factor in projectile trajectory-drop for specific ranges. The effects of wind drift should also be reduced when compared to other weapons that discharge gyroscopically stabilised projectiles. Contratry to common beleif, wind does not physically blow projectiles from left to right or right to left. The drift a projectile experiences during flight is a result of its interaction with the atmosphere. Gyroscopically stabilised projectiles experience differences in pressure on their flanks according to the clockwise or anticlockwise spin imparted to them and it this spin that initiates the drift process, to the left, or to the right. According to the law of inertia, when a motion in a particular direction has been iniatiated it is much easier then for an external force moving in the same direction to exacerbate this initial imparted motion.The rather pointed and angled nose of "passive" projectiles serves only to deflect the projectile further.off course.

Details of embodiments of the invention

[0005] A gun comprising a source of propulsion in the form of a rimfire or centrefire cartridge or a compressed-air source or other (8) and utilising solely as a projectile, a precision-ball (1) made of a suitable material such as free machining brass or high lead bronze or gilding metal or other, or a combination of these materials, that also employs a stainless steel or other precision-barrel (2) with a precision smooth-bore (3) with a groove/channel cut along the southern hemisphere of the muzzle of the bore (4), also employing a toothed rack/rail made of HSS tool steel or tungsten carbide (5) of specific dimensions and perforated in specific places, that is slotted through along the northern hemisphere of the muzzle of the barrel and is non-permanently affixed via steel holding pins (6), so that only the teeth penetrate a portion of the northern hemisphere of the muzzle of the bore, a specific distance, and engage and indent (9) the northern leading edge/circumference of the precision ball as it progresses to exit the barrel of the gun, effectively transforming the leading edge/circumference of the virgin ball into a cog wheel. The length of the toothed rack/rail is equal to the calibre of the weapon multiplied by 3.14159, however any specifications or dimensions relating to the toothed rack/rail, it's positioning and the method of affixing it to the barrel are subject to change.

[0006] The virgin ball accelerates through the precision smoothbore barrel until its southern hemisphere runs over the groove/channel cut along the southern hemisphere of the muzzle of the bore. High pressure gasses or air is forced under the ball initiating the backward/upward spin process. When the ball finally encounters the first of a series of triangular teeth of the rack/rail, penetrating the northern hemisphere of the muzzle of the bore, it is then mechanically forced to rotate upwards/backwards as each progressive tooth engages and indents it's northern leading edge. The ball rolls backwards/upwards out the barrel at of the gun at particular velocity and under the influence of the toothed rack/rail that is pressing it downwards against the southern hemisphere of the muzzle and is effectively locking it in place so that,

when viewed from the front, it cannot rotate either clockwise or anticlockwise.

Brief description of the several views of the drawings

figure 1- is a general overview of the gun

[0007]

1 Precision ball
2 Precision barrel
3 Precision barrel bore
4 Groove/channel cut along the southern hemisphere of the barrel bore. See through image
5 Toothed rack/rail made of made of HSS tool steel or tungsten carbide, slotted through the northern hemisphere of the barrel so that only the teeth penetrate the bore. See through image showing rack/rail slotted through along the muzzle of the barrel
6 Steel holding pins
7 Breech
8 Rimfire or centrefire cartridge or compressed-air source or other.

figure 2 - depicts the side profile of the muzzle of the gun

[0008]

1 Precision ball. See-through image showing triangular indentations made by the teeth of the rack/rail on the leading edge/circumference of the ball
2 Precision barrel
3 Precision barrel bore
4 groove/channel cut along the southern hemisphere of the barrel bore. See through image
5 Toothed rack/rail made of made of HSS tool steel or tungsten carbide, slotted through the northern hemisphere of the barrel so that only the teeth penetrate the bore. See through image showing rack/rail slotted through along the muzzle of the barrel
6 Steel holding pins
9 Indentations made on the ball by the teeth of the rack/rail
10 High-pressure air or hot gases

figure 3 - depicts the front section of the muzzle of the gun

[0009]

2 Precision barrel
3 Precision barrel bore
4 groove/channel cut along the southern hemisphere of the barrel bore
5 Toothed rack/rail made of made of HSS tool steel or tungsten carbide, slotted through along the northern hemisphere of the barrel so that only the teeth penetrate the bore.
6 steel holding pins that transverse the wall of the nothern hemisphere of the barrel and the toothed rack/rail, effectively securing the toothed rack/rail to the muzzle of the barrel in a non-permanent manner.

figure 4 - depicts a precision ball with a core

[0010]

11 copper jacket
12 a core consisting of a solid tungsten carbide ball, a ceramic ball, a tunsgten paste, a copper paste, or a cavity i.e. hollow.

Claims

1. What I claim as my invention is a weapon of any caliber, size or form utilising solely as a projectile a precision-ball, consisting of a smoothbore precision-barrel and a metal toothed rack/rail affixed along the northern hemisphere of the muzzle of the barrel and penetrating the northern hemisphere of the bore a specific distance so that the teeth engage and indent the leading edge/circumference of the ball to the effect that a specific rate of upward spin is imparted to the said ball as it exits the muzzle of the weapon.

2. A firearms ammunition cartridge consisting of, as a projectile, a solid precision ball made of free machining brass, to be used exclusively in the weapon of Claim 1.

3. A firearms ammunition cartridge consisting of, as a projectile, a precision ball with a jacket made of copper and a hollow core, to be used exclusively in the weapon of Claim 1.

4. A firearms ammunition cartridge consisting of, as a projectile, a precision ball with a jacket made of copper and a solid tungsten carbide core, to be used exclusively in the weapon of Claim 1.

5. A firearms ammunition cartridge consisting of, as a projectile, a precision ball with a jacket made of copper and a solid steel core, to be used exclusively in the weapon of Claim 1.

6. A firearms ammunition cartridge consisting of, as a projectile, a precision ball with jacket made of copper and a solid ceramic core, to be used exclusively in the weapon of Claim 1.

7. A firearms ammunition cartridge consisting of, as a projectile, a precision ball with a jacket made of copper and a tungsten paste core, to be used exclusively in the weapon of Claim 1.

8. A firearms ammunition cartridge consisting of, as a

projectile, a precision ball with a jacket made of copper and a copper paste core, to be used exclusively in the weapon of Claim 1.

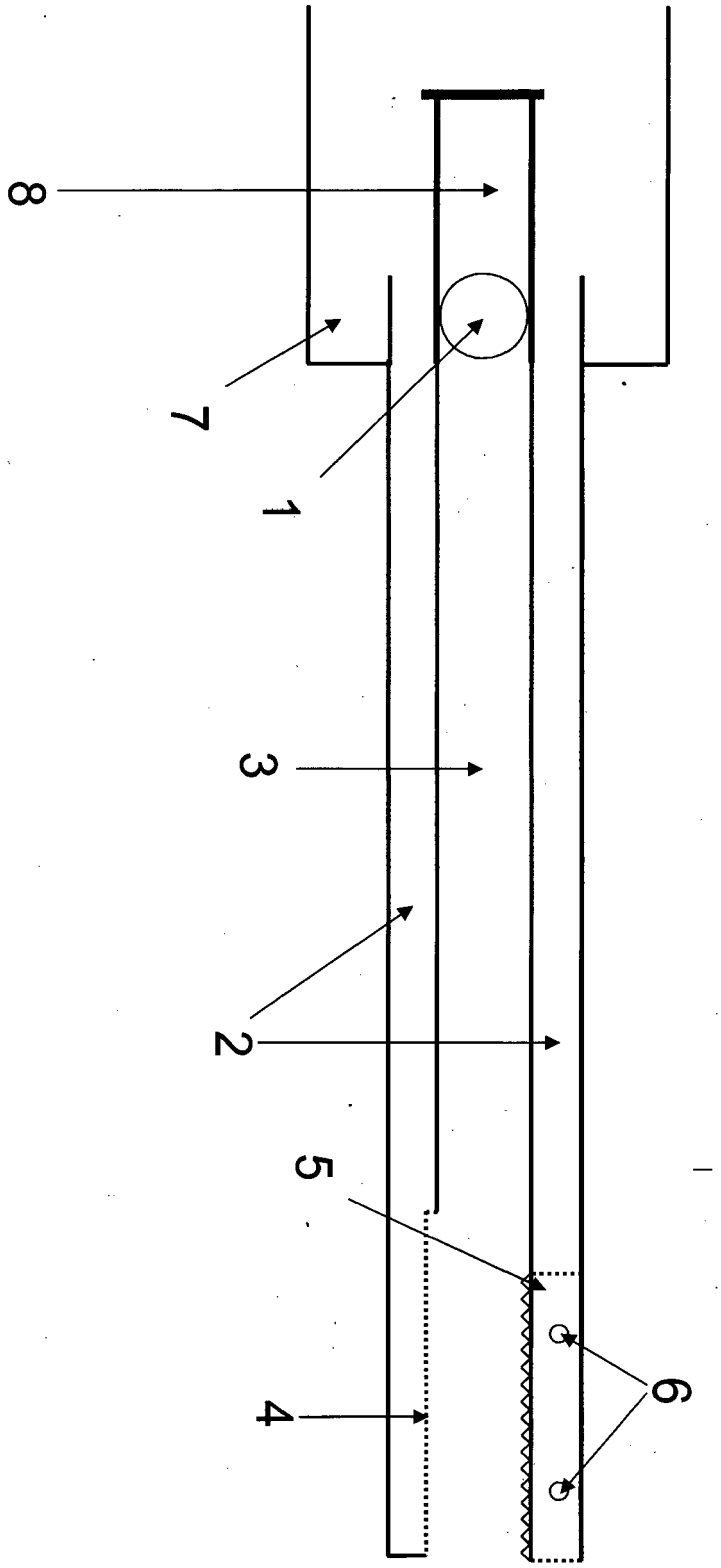

figure 1

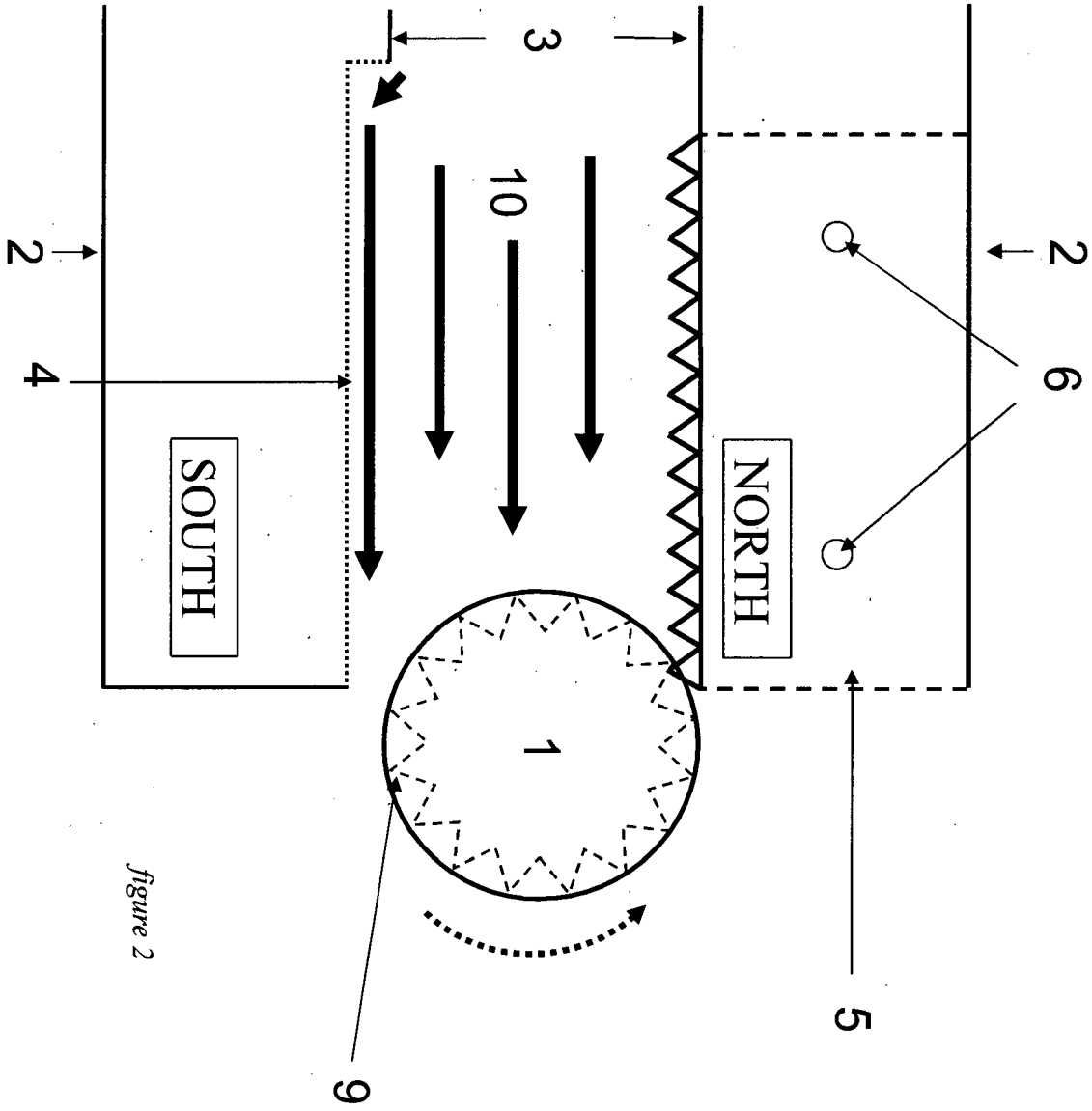

figure 2

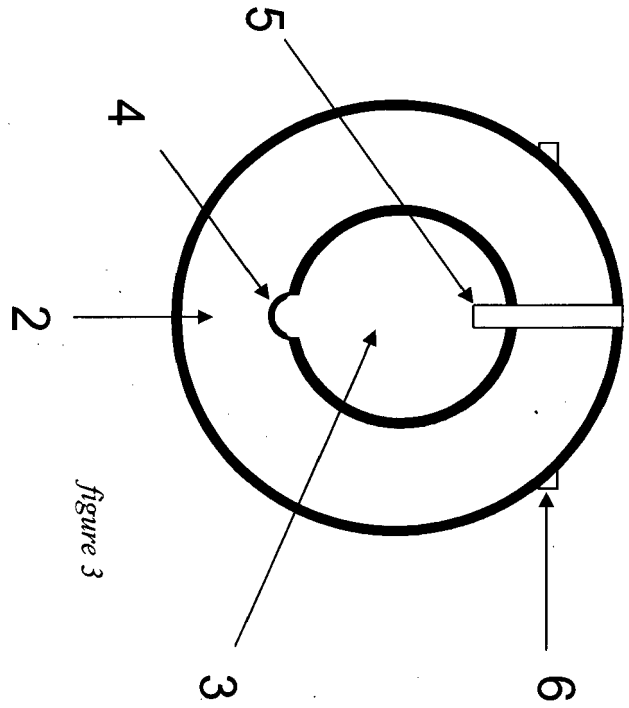

figure 3

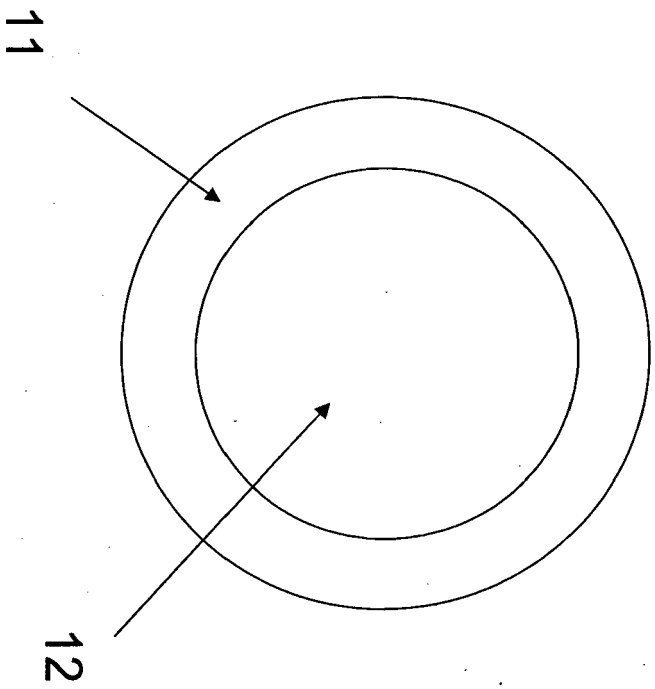

figure 4

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EUROPEAN SEARCH REPORT

Application Number
EP 14 00 1806

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TECHNICAL FIELDS SEARCHED (IPC)
F41A

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	14 October 2014	Vermander, Wim

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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E : earlier patent document, but published on, or after the filing date
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EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 14 00 1806

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82