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(54) **MONOLITHIC EXPANDING PROJECTILE**

(57) A projectile is obtained that expands when it hits the target, as it has a spherical element placed at the end of the conical area of greater hardness and toughness than the rest of the projectile and has a perforation that goes from the tip of the conical area to the base of the conical area, comprising a cylindrical body (1) which at one end thereof continues with a decreasing diameter forming a conical area (2) which is finished at its tip with a spherical element (3), where the conical body (2) has a perforation (4) which runs approximately from the base

of the conical area (2) to the free end of the conical area (2) and where the spherical element (3) is attached, where both the cylindrical body (1) and the conical zone (2), except for the perforation (4) made in the conical area (2) are solid, on the other hand, the spherical element (3) is made of a harder and tougher material than the material used in the manufacture of the cylindrical body (1) and the conical zone (2) and the diameter of the spherical element (3) is larger than the diameter of the perforation (4).

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Description

OBJECT OF THE INVENTION

[0001] The object of the present invention is, as the title of the invention states, a monolithic expanding projectile, or one could also speak of a bullet used in hunting which has the particularity that it opens or expands during impact with a very high efficiency due to the aid offered by the material with which the projectile is crowned.

[0002] The present invention is characterised by the special design, configuration and materials used in each part of the project, which has the particularity of being a monolithic expanding projectile that is free of lead and plastic polymers, which facilitates aerodynamics in flight and subsequent expansion once it hits the target.

[0003] Therefore, the present invention falls within the scope of the elements used in hunting as bullets or projectiles.

BACKGROUND OF THE INVENTION

[0004] Traditionally, all newly created bullets or projectiles are topped with a small plastic tip of some kind of polymer, of a much lower hardness than the body of the bullet or projectile. The different and inferior hardness of the material used (softer plastic polymer than the body of the bullet), produces inferior results at long distances, as it reduces the expansion effect due to the kinetic energy carried by the projectile at that moment, the expansion of the projectile will be less when it hits the target, as it does not have the complete design of this invention, as well as being a source of materials that degrade the environment such as plastics and lead.

[0005] Therefore, the object of the present invention is to develop a projectile which does not degrade the environment, i.e., which is free of plastics and lead, which ensures the expansion of the projectile when it hits the target, by developing a projectile as described below and set out in its essentiality in the first claim.

DESCRIPTION OF THE INVENTION

[0006] The object of the present invention is a monolithic expanding projectile comprising a cylindrical body which at one end thereof continues with a decreasing diameter forming a conical area which is finished at its tip with a spherical element, where the conical body has a perforation, preferably cylindrical, which runs approximately from the base of the conical area to the free end of the conical area and where the spherical element of higher toughness and hardness than the copper material from which the projectile is made is attached.

[0007] Both the cylindrical body and the conical area, except for the perforation made in the conical area, are solid, preferably made of copper, while the spherical element at the end of the conical area is made of a harder and tougher material than the material of manufacture of

the cylindrical body and the conical area, preferably, but not limited to, steel of lower hardness than that used in the manufacture of the barrel of the weapon.

[0008] The cylindrical body has a series of annular grooves on its outer surface, separated from each other, followed by ridges. Known in the metallurgical sector as friction relieves or grease nipples, as they are elements that reduce friction in the barrel tube, preventing it from overheating in hunting use.

[0009] Thanks to the features described above, a projectile is obtained that expands when it hits the target, as it has a spherical element placed at the end of the conical area of greater hardness and toughness than the rest of the projectile and has a perforation that goes from the tip of the conical area to the base of the conical area. The projectile also benefits from increased aerodynamics, due to the material used in the manufacture of the spherical element, as its melting temperature is much higher than that of the plastic polymers currently used, ensuring that it arrives at the impact of the target in one piece, and finally a projectile that avoids degrading the environment as it is free of plastics and lead is achieved.

[0010] Unless otherwise stated, all technical and scientific elements used herein have the meaning usually understood by a person skilled in the art to which this invention pertains. In the practice of the present invention, processes and materials similar or equivalent to those described herein may be used.

[0011] Throughout the description and claims, the word "comprise" and its variants are not intended to exclude other technical features, additives, components or steps. For those skilled in the art, other objects, advantages and features of the invention will be apparent in part from the description and in part from the practice of the invention.

EXPLANATION OF THE FIGURES

[0012] As a complement to the present description, and for the purpose of helping to make the features of the invention more readily understandable, in accordance with a preferred practical exemplary embodiment thereof, said description is accompanied by a set of drawings constituting an integral part of the same, which by way of illustration and not limitation represent the following.

Figure 1 shows a side view of the monolithic projectile object of the invention.

Figure 2 shows a longitudinal half-section of the projectile of the preceding figure.

PREFERRED EMBODIMENT OF THE INVENTION

[0013] In view of the figures, a preferred embodiment of the proposed invention is described below.

[0014] Figure 1 shows that the monolithic expanding projectile object of the invention comprises a cylindrical

body (1) which at one end thereof continues with a continuously decreasing diameter, configuring a conical area (2), which has a perforation (4) that goes from the tip of the conical area (2) to the end of the conical body (1) with which it connects, joining a spherical element (3) at the end of the conical area (2) and at the mouth of access to the interior of the opening (4).

[0015] The cylindrical body (1) and the conical area (2) are solid, except for the perforation (4) of the conical area (2), using material preferably but not limited to copper, while the spherical element (3) is made of a material of a higher hardness than the material used in the manufacture of the cylindrical body (1) and the conical area (2). In the case of using, for example, copper for the manufacture of the cylindrical body (1) and the conical area (2), the spherical element, which is always of lower hardness and toughness than the barrel of the gun, may be made of, for example, steel.

[0016] On the cylindrical body, as can be seen in Figure 1, there is a series of annular grooves (6) separated from each other, defining annular protrusions (6), also separated from each other. This alternating arrangement of protrusions (5) and grooves (6) has a lubricating function by reducing friction between the projectile and the barrel tube and consequently reducing overheating and overpressure in the barrel.

[0017] In the embodiment shown and also preferably, but in no way limiting, the number of protrusions (5) is four.

[0018] In Figure 2, it should be noted that, when the longitudinal section of the projectile is shown, the cylindrical body (1) and the conical area (2) are solid.

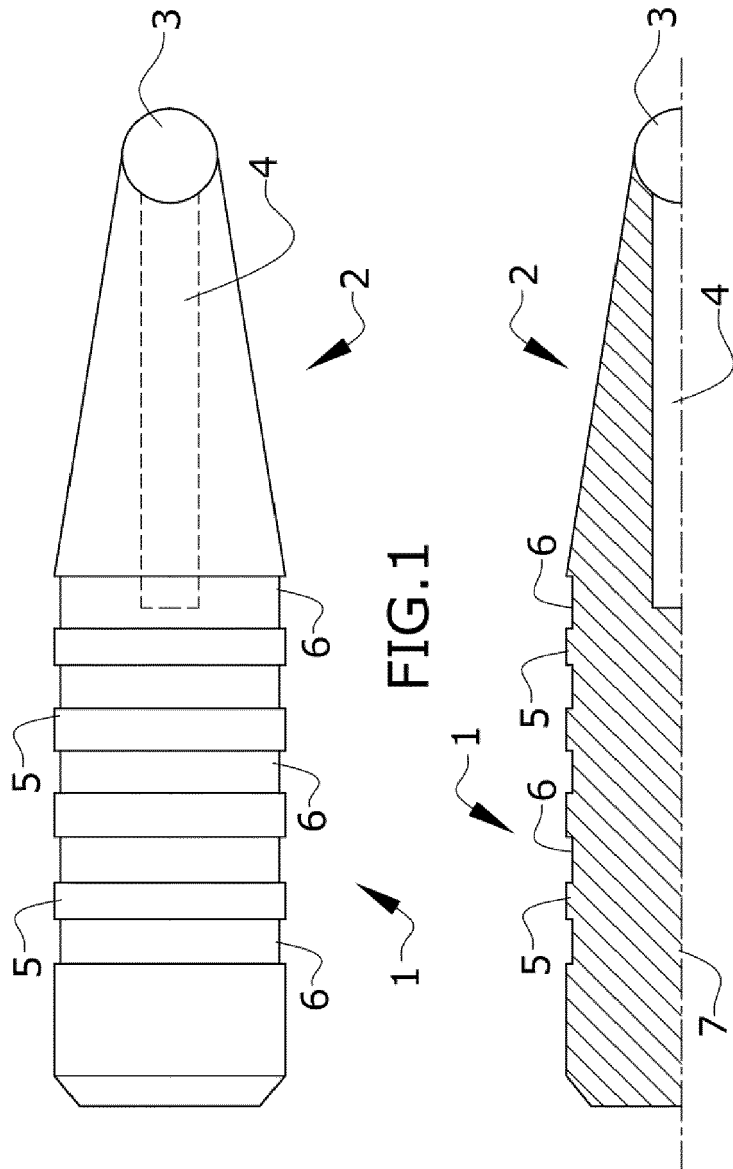
[0019] Having thus adequately described the nature of the present invention, as well as how to put it into practice, it must be noted that, within its essential nature, the invention may be carried out according to other embodiments differing in detail from that set out by way of example, which the protection sought would equally cover, provided that the fundamental principle thereof is not altered, changed or modified.

conical zone (2) and the diameter of the spherical element (3) is larger than the diameter of the perforation (4).

- 5 2. The monolithic expanding projectile according to claim 1, **characterised in that** the cylindrical body (1) and the conical area (2) are made of copper.
- 10 3. The monolithic expanding projectile according to claim 1 or 2, **characterised in that** the manufacturing material of the spherical element (3) is steel.
- 15 4. The monolithic expanding projectile according to claim 1 or 2 or 3, **characterised in that** the cylindrical body (1) has on its outer surface a series of annular grooves (6) separated from each other, which define protrusions at the calibre of the manufactured diameter (5), which reduce the friction of the projectile when it exits through the barrel tube and the overheating of the latter.
- 20 5. The monolithic expanding projectile according to claim 4, **characterised in that** the number of grooves (6) is five.
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Claims

1. A monolithic expanding projectile **characterised in that** it comprises a cylindrical body (1) which at one end thereof continues with a decreasing diameter forming a conical area (2) which is finished at its tip with a spherical element (3), where the conical body (2) has a perforation (4) which runs approximately from the base of the conical area (2) to the free end of the conical area (2) and where the spherical element (3) is attached, where both the cylindrical body (1) and the conical zone (2), except for the perforation (4) made in the conical area (2) are solid, on the other hand, the spherical element (3) is made of a harder and tougher material than the material used in the manufacture of the cylindrical body (1) and the





EUROPEAN SEARCH REPORT

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X	----- US 9 316 468 B2 (SME ENGINEERING PTY LTD [ZA]) 19 April 2016 (2016-04-19) * column 4, lines 19-31; figures 1-7 *	1-5	
			TECHNICAL FIELDS SEARCHED (IPC)
			F42B
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 1 November 2021	Examiner Lahousse, Alexandre
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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5 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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