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(54) **Method for expanding a bullet and expandable bullet**

(57) The invention relates to a method for expanding a bullet and to a bullet for implementing the method. The bullet comprises a cylindrical body (1) and a conically convergent point (2). A cavity (4) filled at least partly with a filling agent (5) is arranged to extend from the point towards the base (3) of the bullet. When such a bullet hits and penetrates a target, force action is directed to the bullet to turn the point of the bullet towards the direction opposite to the direction of travel of the bullet. To slow this, the filling agent is extended outside the cavity in the area of the bullet point (2). As the bullet with such a cap moves on in the target, the filling agent (5) slowly presses into the cavity (4) guided by the sealing surface (6) releasing the point of the bullet.

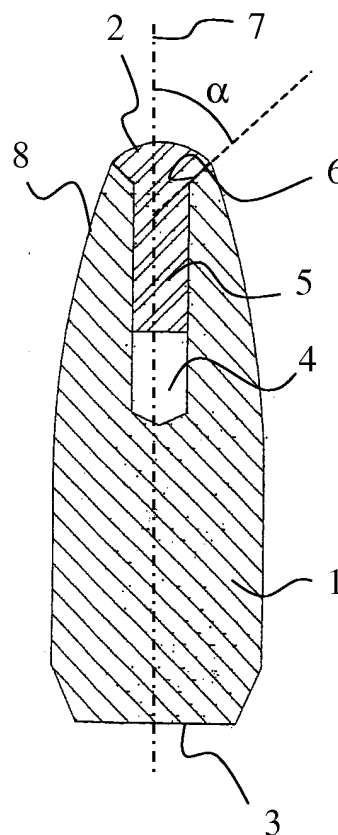


FIG. 1

Description

BACKGROUND OF THE INVENTION

[0001] The present invention relates to a method according to the preamble of claim 1 for expanding a bullet and to a bullet according to the preamble of claim 2. This type of bullet is used especially in hunting or other type of shooting, in which the expansion of the bullet is important.

[0002] It is known per se to use partially jacketed and strongly expanding bullets in hunting. The hunting laws and decrees in many countries even require this.

[0003] However, there are significant drawbacks in the prior art. In bullets according to known embodiments, the bullet point begins to strongly expand immediately the bullet hits its target, for example the skin of a game animal. This action of the bullet does, however, often cause the surface muscles of the game animal to crush. As a result, this damage caused by the bullet makes part of the felled game animal inedible.

[0004] In addition to this drawback, the bullets on the market also often have a very narrow operating range in view of their rate of travel. This means that a bullet shot at a lower rate of travel does not open properly when it hits the target, but on the other hand, higher rates of travel make the bullet burst into pieces as it hits the target. In both cases, the operation of the bullet results in that the animal dies slowly.

BRIEF DESCRIPTION OF THE INVENTION

[0005] It is thus an object of the present invention to develop a method of such structure, and a bullet utilizing the method, that a completely new solution is provided to the above-mentioned problems caused by the prior art.

[0006] This object is achieved by providing the method for expanding a bullet and the bullet implementing this method with the characteristics defined in the claims of this invention. More precisely, the product according to this invention is mainly characterized by what is stated in the characterizing parts of claims 1 and 2.

[0007] Preferred embodiments of the invention are described in the dependent claims.

[0008] The basic idea of the invention is to provide a bullet body made of copper or some other soft, but high-tensile metal and having a hollow cavity or recess. A point piece made of plastic or the like can be arranged in this hollow space. The specific design of the body and the point piece arranged in the hollow space produces a bullet with steady flight properties, but which expands effectively when it hits the target.

[0009] The method and bullet of the present invention are suitable for use both in hunting and in other shooting. The bullet is also suitable for both rifle and pistol shooting.

[0010] The terms 'up', 'down', 'above', 'below' and so

on illustrate the features of the invention in the directions of the bullet of the invention as it is shown in the attached figures.

BRIEF DESCRIPTION OF THE FIGURES

[0011] In the following, some of the preferred embodiments of the invention are described in greater detail with reference to the attached drawing, in which

Figure 1 shows the cross-section of a first preferred embodiment of the present bullet,

Figure 2 shows the cross-section of a second preferred embodiment of the present bullet,

Figure 3 shows the cross-section of a third preferred embodiment of the present bullet, and

Figures 4 to 6 show the action of the bullet of Figure 1 as it hits the target.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0012] In the following, a few preferred embodiments of the present method and bullet are described with reference to the above-mentioned figures. The bullet then comprises the structural parts marked with reference numbers in the figures that correspond to the reference numbers used in this description.

[0013] The present method for expanding the point of a bullet then preferably comprises a bullet described later in more detail and having a substantially cylindrical body 1 and a substantially conically convergent point 2. A cavity 4 is arranged to extend from the point towards the base 3 of the bullet, and the cavity is at least partly filled with a filling agent 5.

[0014] Conventionally, force action to turn the point 2 of the bullet substantially into the direction opposite to the direction of travel of the bullet is immediately directed to the bullet as it hits and penetrates its target. To slow down such a disadvantageous action, the filling agent 5 that fills the cavity 4 of the bullet at least partly is extended to the outside of the cavity in the area of the point of the bullet. This way, when the bullet hits the target, the combined effect of the filling agent and point provides a sealing surface 6 that in accordance with its name seals the point of the bullet to prevent the entry of foreign elements formed by the target into the cavity.

[0015] By correctly selecting the filling agent and bullet materials, a momentary sealing is provided in the point 2 of the bullet. However, as the bullet moves on in the target, the filling agent 5 presses into the cavity 4 due to the force action between the bullet and target and guided by the sealing surface 6. At the same time, the filling agent pressing into the cavity also frees the point of the bullet for the force action directed to it by the target and speeds up the expansion of the bullet. On the other hand, the filling agent, when pressing into the cavity, also expands the bullet at its opening in the cavity. This

way, the expanding point of the bullet is subjected to an ever-increasing force action directed by the target to the bullet and speeding up the final expansion of the bullet.

[0016] The extent and rate of the expansion of the bullet can be significantly adjusted by selecting a different length and/or diameter for the cavity. The shape of the sealing surface and the material of the bullet body can also be used to influence the expansion of the bullet.

[0017] Attached Figure 1 shows a preferred embodiment of the bullet, in which the bullet comprises a substantially cylindrical body 1 and a conically convergent point 2 made of copper, for instance, or by combining several materials. A preferably cylindrical cavity 4 is arranged to extend from the point of the bullet towards the base 3 of the bullet. The diameter and length of the cavity vary strongly depending on the use of the bullet, the gun type and calibre. The diameter of the cavity can be 20 to 60% of the diameter of the body. The length of the cavity can in turn vary between 5 and 48% of the entire length of the bullet.

[0018] This cavity 4 is arranged to receive a filling agent 5 that fills it at least partly. The filling agent often comprises a separate stopper-like piece made especially for this purpose and is referred to as point piece hereafter. The length of the point piece also affects the properties of the bullet and is preferably 15 to 90% in relation to the length of the cavity. This filling agent preferably comprises a plastic material, but may also comprise a combination of several materials.

[0019] As shown in the figure, a sealing surface 6 is formed at the point 2 of the bullet between the cavity 4 and the point piece 5. An essential feature of the sealing surface is its conical shape, whereby the sealing surface expands towards the point of the bullet. The angle α between the sealing surface and the longitudinal axis 7 of the bullet is in the range of 10° to 80°, preferably about 45°. Because the point piece forms the outermost section of the point of the bullet, it extends beyond the cylindrical walls of the cavity and can be described as a mushroom with a small pileus, for instance. The positioning of the sealing surface can also be used to affect the behaviour of the bullet. The sealing surface has a diameter that can vary between 30 to 90% of the diameter of the body of the bullet, and the selected diameter of the sealing surface defines its positioning in relation to the cylindrical body 1.

[0020] Attached Figure 2 shows a second alternative embodiment of the bullet that differs from the embodiment of Figure 1 in the structure of the sealing surface 6 at the point 2 of the bullet.

[0021] In the embodiment of Figure 1, the conical shape of the sealing surface 6 is arranged to extend from the edge of the cavity 4 to the outer jacket 8 of the bullet. In the embodiment of Figure 2, the sealing surface of the bullet comprises, however, not only the conical surface 6 but also a cylindrical section 9 that is substantially parallel to the longitudinal axis 7 of the bullet. This type of cylindrical section is conventionally only 0.1

to 2.0 mm in size. The length of the cylindrical section is most preferably about 0.5 mm. It is, however, possible to make a bullet in which this cylindrical section is as much as 50% of the length of the bullet.

[0022] Because the point piece in this embodiment of Figure 2 also forms the outermost section of the point of the bullet, the point piece extends beyond the cylindrical walls of the cavity in this case, too. Due to the cylindrical section of the sealing surface, a filling agent aggregation that is significant in mass and especially in volume is this way formed on the outer edge of the cavity.

[0023] Finally, attached Figure 3 shows a third alternative embodiment of the bullet that also differs from the embodiments of Figures 1 and 2 in the structure of the sealing surface 6 at the point 2 of the bullet.

[0024] The sealing surface 6 in the embodiment of Figure 3 comprises both the conical section of Figure 1 and a planar surface 10 perpendicular to the longitudinal axis 7 of the bullet. This planar surface combines the conical section of the sealing surface to the outer jacket 8 of the bullet.

[0025] The present bullet may naturally also comprise any obvious combination of the presented embodiments.

[0026] When the present bullet is shot, the point piece 5, when hitting the target, makes the bullet expand more effectively than usually by pushing into the cavity 4 and pressing the inner walls 11 in the cavity away from each other.

[0027] Figures 3, 4 and 5 show schematically how the bullet expands when it hits and pushes into the target. In the bullets of the embodiments of Figures 1, 2 and 3, the point pieces push into the cavity 4 of the bullet sliding along the sealing surface 6 of the bullet when the bullet hits a targeted game animal, for instance. At the initial stage of the impact, the sealing surface 6 of the bullet and the point piece 5 in the cavity prevent the fluid and muscle mass in the tissues of the game animal from entering the cavity 4, as a result of which the bullet pushes quite deep into the target. However, the pushing of the wedge-like point piece into the cavity due to the impact changes the shape of the point of the bullet as shown in Figure 4. As the bullet enters more deeply into the target, the point piece also pushes deeper into the cavity. The retreating of the point piece away from the point of the bullet allows a controlled flow of the fluids and muscle mass of the game animal into the cavity. This causes what is known as the rolling outwards of the point of the bullet that is shown in Figures 5 and 6. The fluid and muscle pressure forms the bullet into its final shape shown in Figure 5.

[0028] Thus, the present bullet provides an inlet wound with only a little crushing and the transfer of the high kinetic energy of the bullet to the inner organs.

[0029] It will be understood that the above description and the related figures are only intended to illustrate the present solution. The solution is thus not restricted to

the embodiment described above or in the claims, but many modifications and variations possible within the scope of the idea disclosed in the attached claims will be apparent to a person skilled in the art.

Claims

1. A method for expanding the point of a bullet which comprises a substantially cylindrical body (1) and a substantially conically convergent point (2), from which point a cavity (4) filled at least partly with a filling agent (5) is arranged to extend towards the base (3) of the bullet, and when the bullet hits its target, it enters the target and the force action directed by the target to the bullet makes the point of the bullet turn substantially towards the direction opposite to the direction of travel of the bullet, **characterized in that**

the filling agent (5) in the bullet is extended outside the cavity (4) in the area of the point (2) of the bullet in such a manner that the diameter of the filling agent outside the cavity is made larger than the diameter of the cavity, whereby

when the bullet hits the target, the filling agent forms together with the point of the bullet a sealing surface (6) on it to prevent foreign elements from entering the cavity,

when the bullet enters the target, the filling agent (5) presses into the cavity due to the force action between the bullet and the target and guided by the sealing surface (6),

the filling agent pressing into the cavity (4) thus on one hand frees the bullet point (2) for the force action directed to it by the target, and

on the other hand, when pressing into the cavity, expands the cavity at its opening to subject the bullet to a stronger force action directed to it by the target.

2. A bullet comprising a substantially cylindrical body (1) and a substantially conically convergent point (2), from which point a cavity (4) filled at least partly with a filling agent (5) is arranged to extend towards the base (3) of the bullet, **characterized in that** the cavity (4) is, when penetrating the point (2) of the bullet, arranged to form a sealing surface (6) on it,

the sealing surface comprising a surface positioned at least partly at an angle α in relation to the longitudinal axis (7) of the bullet to form a substantially conical surface descending to the cavity in such a manner that

the filling agent (5) in the cavity is arranged to extend over substantially the entire sealing surface (6) up till an outer jacket (8) of the bullet.

3. A bullet as claimed in claim 2, **characterized in that**

the sealing surface (6) comprises a conical surface positioned at an angle α and extending to the outer jacket (8) of the bullet.

4. A bullet as claimed in claim 2, **characterized in that** the sealing surface (6) comprises a conical surface at an angle α and connected to the outer jacket (8) of the bullet with a surface that is substantially perpendicular to the longitudinal axis of the bullet.

5. A bullet as claimed in claim 3 or 4, **characterized in that** the sealing surface (6) comprises a section parallel to the longitudinal axis (7) of the bullet.

6. A bullet as claimed in claim 5, **characterized in that** the sealing surface parallel to the longitudinal axis (7) of the bullet comprises a cylindrical surface (9).

7. A bullet as claimed in any one of claims 2 to 6, **characterized in that** the sealing surface (6) forms an angle α in relation to the longitudinal axis (7) of the bullet and having a size of 10° to 80° .

8. A bullet as claimed in claim 7, **characterized in that** the angle α is 45° .

9. A bullet as claimed in any one of claims 5 to 8, **characterized in that** the section parallel to the longitudinal axis (7) of the bullet is 0.1 to 2.0 mm in size.

10. A bullet as claimed in any one of claims 2 to 9, **characterized in that** the filling agent (5) in the cavity (4) comprises a combination of several materials.

11. A bullet as claimed in any one of claims 2 to 10, **characterized in that** the filling agent (5) fills 15 to 90% of the length of the cavity (4).

12. A bullet as claimed in any one of claims 2 to 11, **characterized in that** the body (1) of the bullet comprises a combination of several different materials.

13. A bullet as claimed in any one of claims 2 to 10, **characterized in that** the body (1) of the bullet comprises copper.

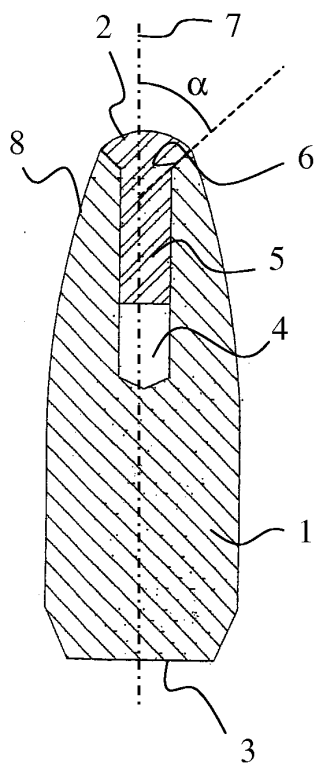


FIG. 1

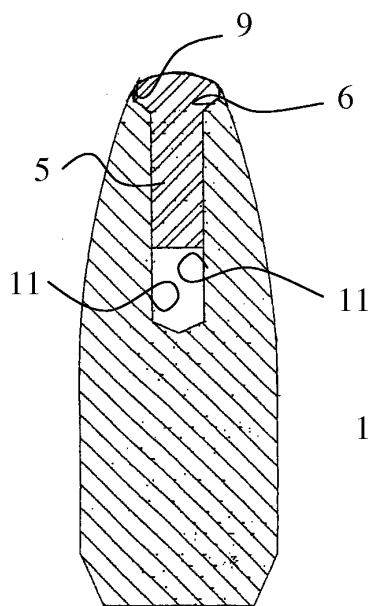


FIG. 2

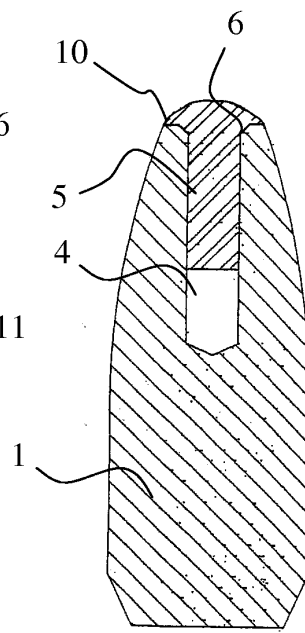


FIG. 3

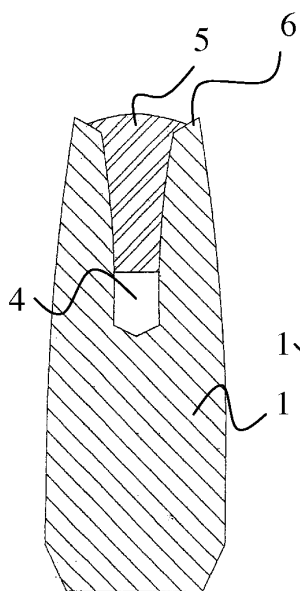


FIG. 4

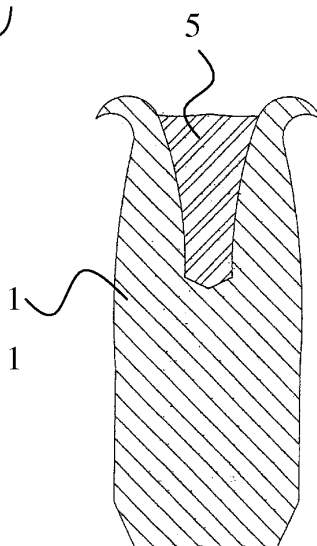


FIG. 5

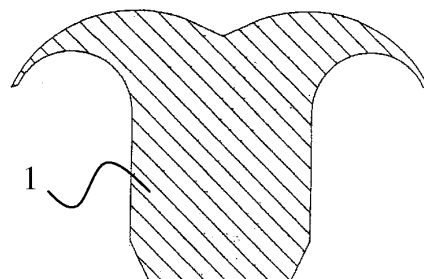


FIG. 6



European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 03 10 0967

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			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
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The present search report has been drawn up for all claims			
Place of search MUNICH		Date of completion of the search 1 August 2003	Examiner Herrera, M
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EP 03 10 0967

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