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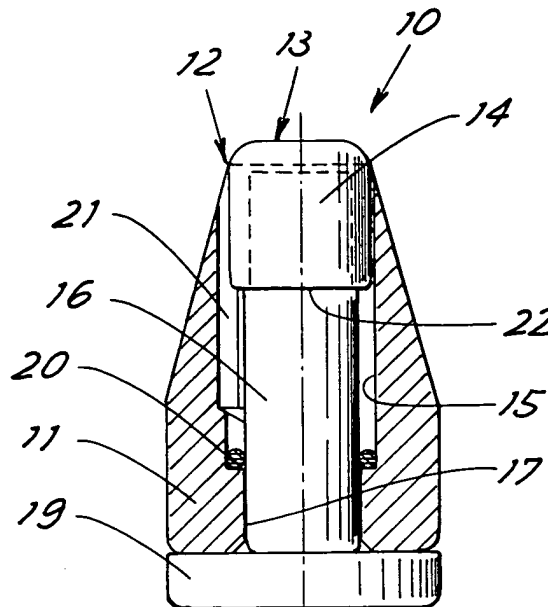
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(54) **A controlled-expansion bullet**

(57) An expansion bullet comprises a hollow housing (11) having an open tip (12) and containing a sliding element (13) designed to slide backward upon an impact against a target. The sliding element (13) comprises a tip portion (14) appearing at an opening (12) on the housing tip and an axial rear shank (16) that is received

in a corresponding hole (17) at the rear bottom of the housing to be slidably guided in said backward stroke. The housing (11) is such made as to open flowerwise under the thrust of material from the target entering the housing tip simultaneously with a back movement of said sliding element (13).



**Fig. 1**

## Description

**[0001]** The present invention relates to a controlled-expansion bullet adapted to enable a reduced and controlled penetration into the target.

**[0002]** Known in the art are bullets such made as to open flowerwise upon an impact, so that they have a little penetration. In a known preferred embodiment, these bullets comprise an outer housing having a hollow tip in which a body (in the form of a small ball, for example) is received, which body upon the impact against a target is pushed backward urging the bullet tip to open.

**[0003]** These bullets are used by the police force for example, to avoid a projectile fired against an ill-intentioned person passing through the person body and going on in an uncontrolled manner, with risks for the safety of possible hostages or mere passers-by.

**[0004]** In order to limit penetration in an efficient manner without on the other hand making the bullet ineffective, a timely and optimal flowerwise opening of the housing is very important.

**[0005]** It is a general aim of the present invention to provide a bullet of the expansion type having a better and safer operation as compared with the known-art bullets. It is a further aim of the invention to provide an expansion bullet having such a structure that a different penetration depth can be obtained by suitably modifying only some dimension parameters thereof during construction.

**[0006]** In view of the above aim, in accordance with the invention, an expansion bullet has been conceived which comprises a hollow housing to internally define a chamber with an open tip and containing a slidable element in the chamber which is designed to slide backward in the chamber itself upon an impact against a target, the sliding element comprising a tip portion appearing at an opening on the housing tip and an axial rear shank that is received in a corresponding hole at the rear bottom of the housing to be slidably guided in said backward stroke, the housing being such made as to open flowerwise under the thrust of material from the target which enters the housing from the tip simultaneously with a back movement of said sliding element in the chamber.

**[0007]** For better explaining the innovative principles of the present invention and the advantages it offers over the known art, possible embodiments applying said principles will be described hereinafter by way of example only with the aid of the accompanying drawings. In the drawings:

- Fig. 1 represents a view of a bullet in accordance with the invention, sectioned along line I-I in Fig. 2;
- Fig. 2 is a front view of the bullet in Fig. 1;
- Fig. 3 is a view similar to that in Fig. 1 and sectioned along line III-III in Fig. 4, of the bullet in Fig. 1 after an impact against a target;
- Fig. 4 is a front view of the bullet in Fig. 3.

**[0008]** With reference to the drawings, shown in Fig. 1 is an expansion bullet, generally identified with 10, comprising a hollow housing 11 (made of softer material, copper for example) with an open tip 12 and containing an element 13 (made of harder material, brass for example) in a chamber 15, which element is designed to slide backward upon the impact against a target. In the embodiment shown, the stroke of the sliding element is limited by the starting distance between a step 22 and the bottom of chamber 15 in the housing.

**[0009]** Element 13 has a head portion 14 the side surface of which slides within the axial chamber 15 formed in the hollow housing. Projecting backward from the head side 14 is a rear shank 16 passing through the housing bottom at an axial hole 17 so as to project from said bottom and widen out in the form of a washer 19 of substantially the same diameter as that of the housing bottom. This washer can be made of one piece construction or not with the end extremity of the shank. Consequently, head 14 can be made of one piece construction or not with shank 16 to enable easy mounting of the bullet. For example, with a washer made unitary with the shank, the head 14 can be screw-mounted or riveted on the shank after insertion of the shank from the outside through the hole at the bottom and within chamber 15. On the contrary, with a head made unitary with the shank, the washer can be screw-mounted or riveted on the rear end of the shank after insertion of the shank into the chamber to come out of the projectile bottom through hole 17. Alternatively, element 13 can be made of one piece construction with the washer (which must not necessarily be of the shape herein shown) formed by riveting of the shank 16 end after mounting of the element in the seat 15 and through hole 17.

**[0010]** Advantageously, in the embodiment herein shown, washer 19 is the bullet bottom supporting the impact in the shooting step and it can be made suitably hard, irrespective of the relative yielding feature that, on the contrary, must be supplied to housing 11 to enable opening of same.

**[0011]** As diagrammatically shown in chain line in Fig. 3, the washer can also have a smaller diameter than the bullet diameter and be embedded in a suitable seat 18 at the washer bottom.

**[0012]** Housing 11 is made so as to open flowerwise under the thrust of material from the target entering the housing tip simultaneously with a backward movement of the sliding element 13. To facilitate flowerwise opening of the tip, the housing in the tip region is provided with means facilitating separation of its side wall into petals.

**[0013]** Advantageously, said facilitating means comprises relieves 21 distributed at intervals on the periphery of the inner wall of the chamber for receiving the sliding element and directed backward from the housing tip.

**[0014]** To prevent a completely free sliding of element 13 and therefore avoid untimely and accidental back-

ward movements (not caused by the bullet impact on the target) of the element in the chamber, during movements of the projectile for example before mounting of same in the hull, means resisting to a completely free backward sliding of the sliding element may be provided. This means is able to avoid accidental sliding but does not hinder the backward movement of element 13 under the thrust imparted thereto by the impact against the target.

**[0015]** For the purpose, it has been particularly advantageous for the resisting means to comprise an annular friction element 20 coaxially disposed between the sliding element and the housing. This element can be a suitably sized Seeger ring or an O-ring.

**[0016]** Diagrammatically shown in Fig. 2 is bullet 10 after the impact against the target, with the sliding element 13 withdrawn within the housing and the housing completely "flowerwise" open.

**[0017]** Opening is caused by the soft material of the target that, exerting pressure on the head of the sliding element, causes a backward movement of the latter and penetrates into the cavity becoming gradually clear, so that it gets wedged and forces expansion of the petal extremities. The effect can be easily calibrated during manufacture of the bullet by suitably selecting the length and number of the relieves 21 to weaken areas of the housing wall to a more or less important degree, as well as selecting the stroke of element 13 in the chamber to adjust the amount of the target material entering the housing cavity.

**[0018]** At this point it is apparent that the intended purposes have been achieved. The bullet in accordance with the invention supplies excellent performance and a satisfactory amount of penetration. Shot tests in ballistic gelatine have shown suitably low penetration values. In addition, by modifying the above mentioned parameters the desired expansion and perforation values can be reached with ease.

**[0019]** As a further advantage of the projectile in accordance with the invention, in the housing of a high-density target the bullet reduces its expansion, accordingly increasing its penetration capacity.

**[0020]** Due to the presence of the cylindrical guide shank 16 it is ensured that during the back sliding the whole body keeps axially centred. In this way opening of the petals is symmetric. Furthermore, the inner element is also used as a perforating element. In fact, the element shape can be modified and at the maximum point of its back movement, the element becomes integral with the outer portion practically forming a solid metal block.

**[0021]** Obviously, the above description of an embodiment applying the innovative principles of the present invention is given by way of example only and therefore must not be considered as a limitation of the scope of the patent rights herein claimed. For example, different sizes of the several different bullet parts can be envisaged to obtain different ballistic and/or penetration fea-

tures. In addition, the means hindering accidental backward movement of the inner element can be different from those shown. For instance, either a helical spring disposed on the shank may be provided to react between the step 22 and the chamber bottom, or friction between the housing and sliding portion can be utilised.

## Claims

1. An expansion bullet comprising a hollow housing (11) to internally define a chamber (15) with an open tip (12) and containing a slidable element (13) in the chamber (15) which is designed to slide backward in the chamber itself upon an impact against a target, the sliding element (13) comprising a tip portion (14) appearing at an opening (12) on the housing tip and an axial rear shank (16) that is received in a corresponding hole (17) at the rear bottom of the housing to be slidably guided in said backward stroke, the housing (11) being such made as to open flowerwise under the thrust of material from the target which enters the housing from the tip simultaneously with a back movement of said sliding element (13) in the chamber.
2. A bullet as claimed in claim 1, **characterised in that** the housing (11) in the tip region has means (21) facilitating separation of its side wall into petals during the flowerwise opening.
3. A bullet as claimed in claim 1, **characterised in that** the shank end (16) appears from said hole (17) at the rear bottom of the housing and widens in a radial direction in the form of a washer (19) to at least partly cover the outer bottom of the housing.
4. A bullet as claimed in claim 3, **characterised in that** said washer (19) is received in a seat (18) formed at the outer bottom of the housing.
5. A bullet as claimed in claim 1, **characterised in that** the separation-facilitating means comprises relieves (21) on the inner wall of the chamber (15) for receiving the slidable element and directed backward from the housing tip.
6. A bullet as claimed in claim 1, **characterised in that** it comprises means (20) for resisting the free backward sliding of the sliding element.
7. A bullet as claimed in claim 6, **characterised in that** the resisting means comprises an annular friction element (20) coaxially disposed between the sliding element and the housing.

