

The present invention concerns a telescopic grenade of the type having a head which is extended by a tubular tail containing a bursting charge as well as a firing chain of the latter, and in which said tail is composed of two tubular, telescopic parts, one of which is joint with said head, carrying two tubular, telescopic parts of said firing chain with the latter, and the other tubular, mobile part of which carries the remaining part of the latter, whereby the grenade has been provided with guide means containing at least one groove extended by a curved groove and a finger working on said tubular, mobile part on the one hand, and on the whole formed by the head and the tubular element joint with the head on the other hand in order to assign an angular position to those tubular parts as a function of their relative axial position, the mobile part of the tail containing at its front end an element carrying the finger which works in conjunction with the grooves and carrying the part of the firing chain that is carried by that mobile part, whereby the tail also contains a safety device that can be disconnected, restricting the movement of the mobile part of the tail as said tail is extended and that is disconnected as soon as the grenade is launched, the grenade having means which restrict the movement of the mobile part of the tail towards said head.

A grenade of this type is described in American patent US-A-4 448 129. The guiding means in this grenade contain two longitudinal grooves and one diagonal groove connecting these grooves in the tubular part that is joint with the head, the finger being fixed on the mobile part of the tail that crosses one of the longitudinal grooves as the tail is extended before the launching. A safety device restricts this extension, the safety device being deformed and disconnected at the time of the launching due to the acceleration of the head and the tubular part that is joint with it in relation to the mobile part. Because of said deformation, the finger can go from the above-mentioned groove to the other longitudinal groove which

has a curved part at the front. The finger crosses this last groove as the tail parts interlock immediately after the launching. Due to the curved part of the groove, the mobile part will rotate in relation to the other part, resulting in an alignment of the fire chain. A projection in the curved part of the groove retains the tail parts from interlocking until the moment of the hit.

Although these well-known projectiles are very efficient, the present invention concerns such a projectile offering considerable advantages on top of the advantages of the projectiles already known. In particular, the invention aims to provide a very feeble grenade, insensitive to shocks, having a simple and vigorous bursting charge and which can be easily made sensitive with regard to the controllable hit and provides certainties as to the beginning of the trajectory.

To this aim, the element carrying the finger has the form of a case which is mounted fixedly on the mobile part of the tail with means that can be disconnected through the effect of the propulsion gases, whereby the case can axially slide on the mobile part as soon as said means which secure the case have been disconnected, and whereby the means restrict the movement until the moment of the hit, letting the case through in its sliding position, and the parts of the tail are equipped with a passage for the propulsion gases, connecting in the extended position of the tail the interior of the mobile part of the tail with a circular chamber formed between the case and the mobile part and restricted by a part of the case at the front and a part of the mobile part at the back, the propulsion gases reaching the chamber via said passage causing an axial movement of the case in relation to the mobile part of the tail and at the same time the disconnection of the means that secure the case.

In a particular embodiment according to the invention, the grenade is provided with means that can determine the exact position of the respective parts of the extended tail, whereby these means consist of at least a radial chamber provided in a sleeve which forms the back end of the part joined with the head, whereby the chamber houses a bullet that is pulled by a spring and whereby said bullet can work in conjunction with a notch provided to this aim in the inside wall of said mobile part of the tail.

In a preferred embodiment according to the invention, the grenade is provided with means which prevent a premature detonation, whereby these means consist of a stop against which the case, when standing in its sliding position with regard to the mobile part, can rest, the stop being pulled by a spring whose tension is decisive for the resistance that the projectile is to encounter before the percussion point that is part of the fire chain can penetrate in the detonator.

In order to explain the characteristics of the invention, by way of example only and without being limitative in any way, an example of an embodiment according to the invention is described with reference to the accompanying drawings, where:

fig. 1 represents a projectile according to the invention in storage and transport position;

fig. 2 represents the projectile according to figure 1 in launching position, i.e. before the shooting;

fig. 3 is a cross-section, to a greater scale, according to line III-III in figure 2;

fig. 4 represents, to a greater scale, the part indicated by F⁴ in fig. 2;

figs. 5 and 6 are cross-sections according to lines V-V and VI-VI in fig. 4;

fig. 7 represents the projectile according to fig. 1 in launched position, i.e. after the shooting but before the hit, particularly according to line VII-VII of fig. 1; fig. 8 is a cross-section according to line VIII-VIII in fig. 7; fig. 9 is a cross-section, to a greater scale, of the part indicated by F9 in fig. 7; fig. 10 shows a view comparable to that in fig. 4, but for a variant according to the invention; fig. 11 represents a variant to the embodiment shown in fig. 2.

The projectile represented in the figures contains a head 1 and a tubular, telescopic tail 2 with fins 3. The tail 2 is made up of two parts 4-5, part 4 of which is joined with the head 1, and part 5 of which can slide around the first part. The head 1 has a platform 6 at the inside, provided with a percussion point 7 and a device 8 that prevents an involuntary detonation. The head 1 is fixed at the far end of a sheath 9, whose other far end is provided with a sleeve 10.

Around the sheath 9 and between the platform 6 and the sleeve 10 has been provided an body 11 that constitutes the bursting charge of the projectile. This body 11 has one single, longitudinal groove 12 that is extended, at its far end closest to the head 1, by a curved part 13.

A finger 14 works in conjunction with the groove 12-13, fixed in a case 15 mounted in an axial, sliding way on the part 5 of the tail 2.

A chamber 16 is formed between the two parts 4-5 housing a spring 17 that works on a shoulder 18 of the sleeve 10. The latter has a circular groove 19 that communicates, in the position shown in fig. 2, with radial holes 20 provided in said

part 5 and communicating in turn with a circular chamber 21 in the case 15. Two grooves 22 run into the groove 19, connecting the groove 19 with the interior of said part 5. The sleeve 10 has two radial chambers 23-24 which each house a bullet 25 pulled by a spring 26.

Said part 5 of the tail 2 has two notches 27-28 upon which the bullets 25 can work.

The case 15 is fixed on said part 5 by means of a ductile retainer 29 which, after it has been deformed, allows for the case 15 to move in relation to the part 5. An elastic locking ring 36 that can work in conjunction with a groove 37 in the part 5 has been mounted in a groove of the case 15.

The pyrotechnical firing chain is made up of the percussion point 7, a detonator 30 and a relay 31, sunken in said bursting charge 11. The percussion point 7 as well as the relay 31 are part of the head 1, whereas the detonator 30 is housed in a notch of the case 15 which, in turn, is part of the tubular, telescopic tail 2.

Said device 8 preventing a premature detonation of the projectile in flight is made up of a shock absorber 32 which contains a spring 33 to absorb shocks.

Finally, the head 1 is extended by a protective tube 34 for the bursting charge 11.

The projectile described above is used and functions as follows.

In the storage-transport position (fig. 1), the part 5 and the case 15 are placed in an angular position with respect to the head 1 and the part 4 in such a way that the point 7 is disaligned with respect to the detonator 30, any relative movement of the part 5 in relation to the head 1 being prevented

by an extension 35 that makes contact with the platform 6. The extension 35 can be fixed on said part 5 or on the platform 6.

In order to bring the projectile in shooting position (fig. 2), the part 5 is pulled. The finger 14 runs through the groove 12 until the bullets 25 enter into the notches 27-28, determining in this way the exact relative position of the parts 4 and 5. In this position, the spring 17 is tightened.

The projectile is ready to enter into the sleeve at the far end of the gun used for its launching.

At the time of the launching, the propulsion gases enter, via the grooves 22, into the circular groove 19 and thus, via the holes 20, into the groove 21. Due to the effect of the propulsion gases on the walls of said groove 21, the case 15, while deforming the retainer 29, moves in relation to the part 5. At the end of the course, the elastic ring 36 falls in the groove 37, thus ensuring the locking of the case 15 in relation to the part 5. At the same time, through the effect of the propulsion gases, the bullets 25 move in the two radial chambers 23-24 against the springs 26, the latter being deformed in such a way that they lose their effect.

After the grenade has left the sleeve of the gun, the parts 4-5 of the projectile interlock, conjointly with the pull-off of the spring 17 and the aerodynamic forces, while the finger 14 first runs through the groove 12, and then through the groove 13.

As the finger 14 penetrates in the groove 13, it causes the part 5 to rotate in relation to the whole 1-4. The projectile is now in the position shown in fig. 7, in which the pyrotechnical chain is aligned.

In this position, the device 8 prevents the part 5 from going any further until the moment of the hit. Indeed, the spring 33 has been developed to prevent a premature detonation, for example resulting from the contact of the projectile with tropical rain.

At the moment of the hit, the raised mass of the part 5 is set in motion, transmitting all its energy to the detonator as it strikes the hammer 7.

It should be noted that the safety of the beginning of the trajectory of the projectile according to the invention can be controlled thanks to the presence of a tube 34 in conjunction with which the case 15 works. Indeed, as the latter moves along the tube 34, it works in it like a dashpot, slowing down in a way said advance by evacuating via a calibrated aperture the air present in the free volume 38, which is created as the projectile is in the position shown in fig. 2. The calibrated aperture is realized as a result of the radial play between the outside diameter of the case 15 and the inside diameter of the tube 34.

According to a preferred embodiment, said springs 26 are calculated such that they remain deformed after the projectile has been launched in order to avoid any rubbing of the bullets 25 against the internal wall of the part 5.

As shown in the drawings, a secondary charge 40 can be housed in the free volume formed by the ball-pass plug 41 and the sleeve 10.

Fig. 10 shows an embodiment in which a small bar 39 has been interposed between the springs 26, made of brittle material that can be destroyed as the bullet passes so as to make the supports of the springs 26 disappear.

Fig. 11 shows an embodiment in which the groove 12 has been provided in the tube 3⁴, whereas the groove 13 has been provided in an extension 42 of the platform 6.



Claims

1. Telescopic grenade of the type having a head (1) which is extended by a tubular tail (2) containing a bursting charge (11) as well as a firing chain (7-30-31) of the latter, and in which said tail (2) is composed of two tubular, telescopic parts (4-5), one of which (4) is joint with said head (1), carrying two tubular, telescopic parts (7-31) of said firing chain with the latter, and the other tubular, mobile part of which (5) carries the remaining part (30) of the latter, whereby the grenade has been provided with guide means (12-13-14) containing at least one groove (12) extended by a curved groove (13) and a finger (14) working on said tubular, mobile part (5) on the one hand, and on the whole formed by the head (1) and the tubular element (4) joint with the head on the other hand in order to assign an angular position to those tubular parts (4-5) as a function of their relative axial position, the mobile part (5) of the tail (2) containing at its front end an element (15) carrying the finger (14) which works in conjunction with the grooves (12-13) and carrying the part (30) of the firing chain that is carried by that mobile part (5), whereby the tail (2) also contains a safety device (29) that can be disconnected, restricting the movement of the mobile part (5) of the tail (2) as said tail (2) is extended and that is disconnected as soon as the grenade is launched, the grenade having means (35) which restrict the movement of the mobile part (5) of the tail (2) towards said head (1), characterized in that the element (15) carrying the finger (14) has the form of a case which is mounted fixedly on the mobile part (5) of the tail (2) with means (29) that can be disconnected through the effect of the propulsion gases, whereby the case (15) can axially slide on the mobile part (5) as soon as said means (29) which secure the case have been disconnected, and whereby the means (35) restricting the movement of the mobile part (5) towards the head (1) are means which restrict this movement until the moment of the hit,



letting the case (15) through in its sliding position, and also characterized in that the parts (4 and 5) of the tail (2) are equipped with a passage (22-19-20-21) for the propulsion gases, connecting in the extended position of the tail (2) the interior of the mobile part (5) of the tail (2) with a circular chamber (21) formed between the case (15) and the mobile part (5) and restricted by a part of the case (15) at the front and a part of the mobile part (5) at the back, the propulsion gases reaching the chamber (21) via said passage (22-19-20-21) causing an axial movement of the case (15) in relation to the mobile part (5) of the tail and at the same time the disconnection of the means (29) that secure the case.

2. Telescopic grenade according to claim 1, characterized in that the means restricting the movement of the part (5) towards the head (1) are composed of an extension (35) provided at the far end, directed towards the head (1) of the part (5) of the tail (2).

3. Telescopic grenade according to claim 1, characterized in that the means restricting the movement of the part (5) towards the head (1) are composed of an extension (35) provided on a platform (6) of the head (1).

4. Telescopic grenade according to claim 1, characterized in that it has means which determine the exact relative position of the parts (4-5) of the extended tail (2), whereby these means consist of at least a radial chamber (23) provided in a sleeve (10) forming the back end of the part (4), whereby, joint with the head, said chamber houses a bullet (25) pulled by a spring (26), whereby said bullet (25) can work in conjunction with a notch (27) provided to this end in the inside wall of said mobile part (5).

5. Telescopic grenade according to claim 4, characterized in that the spring (26) has been calculated such that it is



destroyed, respectively deformed, in a definite way as the grenade is launched.

6. Grenade according to claim 4, characterized in that a support in the form of a small bar (39) made of brittle material is interposed between the springs (26) which are diametrically opposed to one another.

7. Grenade according to claim 1, characterized in that said passage (22-19-20-21) for the propulsion gases which enables the gas to make a relative movement between the case (15) and the mobile part (5) of the tail (2) contains a circular groove (19) provided in a sleeve (10) forming the back end of the part (4) joint with the head (1), at least one groove (22) that communicates with the interior of the mobile part (5) on the one hand, and with said groove (22) and radial holes (20) which connect said groove (19) with said chamber (21) on the other hand.

8. Telescopic grenade according to claim 1, characterized in that said case (15) carries the detonator (30).

9. Telescopic grenade according to claim 1, characterized in that the grooves (12-13) have been provided in a body (11) placed around the part (4) of the tail (2).

10. Telescopic grenade according to claim 1, characterized in that the grooves (12-13) have been provided in a tube (34) extending the head (1) and an extension of the platform (6) of the head (1).

11. Telescopic grenade according to claim 1, characterized in that said means (29) which fix the case (15) on the mobile part (5) of the tail (2) are composed of a retainer (29) that can be deformed due to the movement of the case (15) through the effect of the propulsion gases.



12. Telescopic grenade according to claim 1, characterized in that it has means which prevent a premature detonation, whereby these means are made up of a stop (32) against which the case, when standing in its sliding position with regard to the mobile part (5), can rest, the stop being pulled by a spring (33) whose tension is decisive for the resistance that the projectile is to encounter before the percussion point (7) that is part of the fire chain (7-30-31) can penetrate in the detonator (30).

13. Telescopic grenade according to claim 12, characterized in that the stop (32) is mounted on a platform (6) of the head (1), which carries the percussion point.

14. Telescopic grenade according to claim 1, characterized in that it has safety means for the beginning of the trajectory, whereby these means consist of a tube (34) fixed on the head (1) and surrounding the charge (11).