

PINLESS GRENADE IGNITER AND GRENADE THUS EQUIPPED

The present invention relates to the field of igniter caps for grenades, as well as grenades equipped with such igniter caps,
5 particularly hand grenades.

There exist numerous types of igniter caps for grenades.

Most known igniter caps for hand grenades comprise, as illustrated in the appended figure 1, a pyrotechnic train 10 comprising a detonator 12, a primer 14 associated with a delay composition 16, a
10 striker 20 associated with a spring 22, an arming lever 40, also called a spoon, and a safety pin 50.

The igniter cap is generally screwed to the body containing the working charge of the grenade.

At rest, the safety pin 50 locks the spoon 40 and prevents
15 operation.

To initiate the igniter cap and implement the grenade, the user must withdraw the safety pin 50 by pulling on a ring 52 connected to this pin.

Upon throwing, the unlocked lever 40 separates and releases the
20 striker 20. The pyrotechnic train 10 is then initiated: the striker 20 strikes the primer 14. The primer 14 ignites the delay composition 16 which activates the detonator 12 to cause the explosion of the main charge.

Accidents having been noted in operational theaters, due to
25 devices for arming grenades using pins, it has proven necessary to secure the initiation devices.

Numerous safety solutions have already been proposed.

Examples of known solutions will be found in the following documents: US 3865027, US 3765337, CH 466094, US 1521996, GB
30 1232283, US 2737116, US 4730559, FR 2825462, FR 2864220, ES 2067355, WO 2012/080998, US 8561540, FR 2807510 and FR 2807511.

Certain solutions consist of preventing the accidental withdrawal of the safety pin, as in publications US 3865027 and US 3765337.

Other solutions consist of blocking the percussion mechanism as described in documents CH 466094, US 1521996 and GB 1232283.

Other solutions consist of offsetting the striker 20 or the primer 14 with respect to the complete pyrotechnic train as proposed in documents US 2737116, US 4730559 and FR 2825462.

Document FR 2864220 proposes an igniter cap comprising a three-level safety device: a safety mechanism comprising a cylinder movable between a passive position preventing the removal of a pin and an active position allowing it, a locking member comprising a pushbutton manually activated between at least two stable positions, one position in which it blocks the safety mechanism in the passive position and an activation position in which it blocks the safety mechanism in the active position, as well as an intermediate position releasing the safety mechanism, and means of interrupting ignition comprising a slider disposed perpendicularly to the main axis and the end of which communicates with an arming lever. Initiation is thus triggered after pressing on the pushbutton, rotation of the body with respect to the cylinder, removal of the pin and release of the lever so as to drive the translation of the slider toward a position allowing passage of the fire.

Document US 8561540 discloses a pinless igniter cap for grenade comprising a lever, a rotary thumb switch and a percussion and initiation assembly. At rest, the lever and the switch are engaged by respective teeth so that the lever and the switch prevent their respective displacement. To allow operation, the lever must be driven closer to the body to release the teeth previously engaged and the switch must be turned 90° to position a target facing a striker. The striker is released and activated by a spring when the lever is released.

Document FR 2807510 describes an igniter cap comprising a body equipped with a control mechanism comprising an arming lever and percussion mechanism cooperating with a primary pyrotechnic module capable of ensuring the initiation of a working charge and displaceable axially in the body toward this charge in an initial safety

position. The means of holding the primary pyrotechnic module axially separated from the main working charge comprise a latch elastically biased from an initial safety position in which the latch interferes with the displacement path of the primary pyrotechnic module to prevent its displacement toward the main charge, toward a release position in which the latch separates from the displacement path of the primary pyrotechnic module, the latch itself being held initially in the initial safety position by at least two mechanical blocking means so that the release of the latch requires a double handling of the blocking means.

Document FR 2807511 discloses an igniter cap comprising a body equipped with a control mechanism comprising an arming lever, a percussion mechanism cooperating with a primary pyrotechnic module capable of ensuring the initiation of a working charge, and a latch which is in engagement with the lever, in the storage position, to prevent a free displacement of the arming lever toward its release position, the latch being formed to impose, during the implementation of the igniter cap, an initial displacement of the lever opposite to its displacement required to release the percussion mechanism so as to disengage the latch and the arming lever.

All known solutions, though allowing a certain safety to be attained, prove to be complex and do not give total satisfaction.

The main objective of the present invention is to improve the safety of the initiation systems consisting of igniter caps for grenades, by eliminating their pins.

In fact, the pins used on most igniter caps are identified as currently having two major disadvantages: on the one hand, the pins can, despite the considerable mechanical forces necessary to allow their removal, be accidentally removed; on the other hand, the pins can consequently be modified by users to allow more rapid extraction, but consequently have an increased risk of accidental operation.

The aforementioned objective is attained in the scope of the invention thanks to a pinless igniter cap, comprising a spoon, a pyrotechnic train and a striker suitable for initiating the pyrotechnic train

after release of the spoon, characterized by the fact that the igniter cap further comprises a ring including at least one aperture and movable between a locking position in which the aperture is misaligned with respect to the spoon so that it cannot be released and an activation
5 position in which the aperture is aligned with the spoon to allow its release.

The invention as defined above turns out to be simple in its structure and in its modalities of implementation, compared to the complex solutions proposed according to the prior art. The
10 implementation of igniter caps conforming to the present invention is intuitive and visual: any user is guided in manipulation by the material visualization of the alignment of the aperture of the ring on the spoon to allow release of the latter.

According to another advantageous feature of the invention,
15 means are provided which impose at least two distinct operations or displacements to allow the displacement of the ring between its locking position and its activation position.

The requirement for at least two distinct operations to allow the displacement of the ring offers in particular the following advantages:
20 the handling of the grenade equipped with such an igniter cap can be operated in complete safety because the aforementioned two operations constitute dual safety, inviolability and safety are increased, but nevertheless the ergonomics and the execution time are preserved.

According to a first mode of implementation, the lever must be
25 retracted at first, then the ring must be turned to align its aperture with the lever in a second time.

According to a second mode of implementation, the ring is suitable to be translated by pulling at first, then be turned in a second time to align its aperture with the lever.

30 According to a third mode of implementation, the ring is suitable to be translated by pulling at first, then the lever must be retracted in a second time and finally, in a third time, the ring must be turned to align its aperture with the lever.

Preferably, means conforming to the invention impose pressing on the lever at one moment of the arming phase, to ensure the initiation sequence. Imposing blocking by pressure on the arming lever during the sequence makes it possible to ensure that the implementation is not due to accidental operation.

The igniter cap conforming to the invention comprises a spring associated with the striker. According to a first embodiment, the spring is biased at rest to store at rest the energy necessary for the implementation of the striker. According to a second embodiment, the spring is biased during displacement in translation of the ring so that the spring stores during this displacement the energy necessary for the implementation of the striker.

The present invention also applies to grenades equipped with an igniter cap of the aforementioned type.

Other features, aims and advantages of the present invention will appear upon reading the detailed description which follows and referring to the appended drawings given by way of non-limiting examples and in which:

- figure 1, previously mentioned, illustrates a known igniter cap of the prior art,
- figures 2 and 3 show to axial longitudinal section views of a grenade conforming to a first embodiment of the present invention, with on-board activation energy of the striker, at two successive stages of its implementation: respectively in the rest position and the locking position of a spoon by the ring, and in the release position of the spoon after rotation of the ring and alignment of the aperture of the ring with the spoon,
- figure 4 shows a partial developed view of the inner surface of a skirt of the ring to illustrate the cooperation defined between the complementary-shape means provided respectively for this skirt and on the spoon to initially prohibit any rotation of the ring,
- figure 5 shows a perspective view of the same grenade in the release position of the spoon,

- figure 6 shows an axial longitudinal section view of a grenade conforming to a second embodiment of the present invention, with on-board activation energy of the striker, in the rest position,
- figures 7 to 10 show the same grenade in four successive stages of its implementation: respectively in the storage position at rest, in the pulling position of the ring, in the rotation position of the ring, and in the throwing position,
- figures 11 and 12 show two variants of complementary-shape means provided respectively on the inner face of the ring and on the facing face of the igniter cap, to impose a translation of the ring before allowing its rotation,
- figures 13 to 16 show a grenade conforming to a third embodiment of the present invention, without on-board activation energy of the striker, at four successive stages of its implementation: respectively in the storage position at rest, in the pulling position of the ring, in the rotation position of the ring and in the throwing position,
- figures 17 to 22 show partially exploded views of the grenade conforming to the third embodiment at five successive stages of its implementation: respectively in the storage position at rest, in the pulling position of the ring, in the rotation position of the ring, in the throwing and expulsion of the spoon, in the ejection position of a striker-holding drawer, then in the striking position,
- figures 23 to 26 illustrate details of the structure and of the operation of the grenade conforming to the third embodiment,
- figure 27 shows an axial longitudinal section view of a grenade conforming to the present invention, and
- figures 28 to 31 show a fourth embodiment conforming to the present invention; more precisely figure 28 shows a perspective view of a ring conforming to this fourth embodiment, and figures 29 to 31 show partially exploded view of the grenade conforming to this fourth embodiment in three stages of its implementation: respectively in the storage position at rest, in the pulling position of the ring, and in the biasing position of the arming lever for allowing the subsequent rotation

of the ring, the continuation of the sequence being similar to the steps illustrated in figure 19 to 22 for the third embodiment.

The grenades conforming to the present invention illustrated in appended figures 2 and subsequent comprise a body 60 which accommodates a working load 62 and on the mouth of which is screwed an igniter cap 100.

The body 60, the working charge 62 and the modalities of connection of the igniter cap 100 to the body 60 can be the object of many embodiments and will not be described in detail hereafter.

10 In all the embodiments conforming to the invention, the igniter cap 100 comprises, as is known per se, a body 110 which accommodates and carries a pyrotechnic train 10 comprising a detonator 12, a primer 14 associated with a delay composition 16, a striker 20 associated with a spring 22, a latch 30 and an arming lever 15 40, also called a spoon or a trigger lever.

According to the invention, the igniter cap 100 does not include a pin locking the spoon 40.

The igniter cap 100 is generally screwed to the body 60 containing the working charge 62 of the grenade.

20 The body 110, the pyrotechnic train 10 comprising the detonator 12, the primer 14 and the delay composition 16, as well as the striker 20, the spring 22, the latch 30 and the spoon 40, can be the object of many embodiments and will not be described in detail hereafter.

Recall however that the striker 20 is intended to strike the 25 primer 14 after the latch 30 has ejected the lever 40 and released the striker 20. The pyrotechnic train 10 is then initiated: The primer 14 ignites the delay composition 16 which activates the detonator 12 to cause the main charge 62 to explode.

As was indicated previously, according to the invention the 30 igniter cap 100 further comprises a ring 120. This ring 120 includes an aperture 125. It is movable between a locking position (illustrated for example in figure 2) in which the aperture 125 is misaligned with respect to the spoon 40 so that it cannot be released, and an activation

position (illustrated for example in figure 3) in which the aperture 125 is aligned with the spoon 40 to allow its release and, as a result, the initiation of the pyrotechnic train 10.

5 In the appended figures is referenced O-O a longitudinal axis of main symmetry of the body 60 and of the igniter cap 100. This axis O-O is perpendicular to the bottom 61 of the body opposite the igniter cap 100. It preferably coincides with the displacement axis of the striker 20.

The ring 120 is rotatably mounted about the axis O-O.

10 The ring 120 is composed essentially of a wall 121 in the form of a disk, perpendicular to the axis O-O and centered on this axis O-O, extended by a cylindrical skirt 123 centered on the axis O-O. The wall 121 constitutes the top of the igniter cap opposite the body 60. The skirt 123 surrounds the portion of the body 110 which accommodates the latch 30. Thus, the wall 121 and the skirt 123 constitute the external
15 portion of the igniter cap, directly accessible for manipulation. The displacement of the ring 120 is therefore simple and easy.

The aperture 125 is formed in the cylindrical skirt 123. It extends over the entire height of the skirt 123. The width of the aperture 125, taken in a peripheral direction of the skirt 123, is at least
20 equal to the width of the spoon 40. Typically, the aperture covers an angular opening comprised between 20 and 45°.

The spoon 40 is rotatably mounted about an axis 42 transverse to the axis O-O, internal to the ring 120 and near the wall 121. At rest, the spoon 40 which extends in a longitudinal direction parallel to the
25 axis O-O, rests against the inner face of the ring 120, the aperture 125 not being aligned with the spoon 40 as can be seen in figure 2.

The latch 30 is slidably mounted in the body 110 perpendicularly to the axis O-O facing the spoon 40. The latch 30 is biased radially toward the outside by a spring 32. At rest, however, the radially exterior
30 end of the latch 30 rests against the inner face of the spoon 40 so that the latch 30 cannot be ejected radially. The latch 30 thus urges the spoon 40 to rest against the inner face of the ring 120.

At rest, as can be seen in figures 2 and 3, the latch 30 interferes with the displacement path of the striker 20 so that the striker 20 cannot strike the primer 14.

Depending on the particular embodiment shown in figures 2 and 3, the radially inner part of the latch 30 is placed between the striker 20 and the primer 14 so that the latch clearly prohibits any contact between the striker 20 and the primer 14. Other embodiments are however possible as will be seen hereafter. For example, the latch 30 can, at rest, pass through a hole provided in the striker 20 to limit the allowed displacement of the striker 20.

Also at rest, complementary-shape means are provided respectively on the spoon 40 and on the inner face of the ring 120 to prohibit any rotation of the ring 120. These complementary-shape means can be the object of different embodiments.

Typically, these complementary-shape means can be formed for the first embodiment illustrated in figures 2 and 3, as shown schematically in figure 4, from two longitudinal ribs 122, 124 protruding on the inner face of the skirt 123 of the ring 120 and which frame the spoon 40. As long as the spoon 40 is situated between these two ribs 122 and 124, the rib 120 cannot be driven in rotation about the axis O-O. It is necessary to disengage the spoon 40 from these two ribs 122 and 124, by moving the spoon 40 closer to the axis O-O to allow the rotation of the ring 120.

Alternatively, the aforementioned complementary-shape means can comprise at least one rib protruding on the spoon and suitable for entering, at rest, into a complementary facing groove formed on the inner surface of the skirt 123. To release the ring 120 in rotation, it is appropriate to disengage the aforementioned rib formed on the spoon from the complementary facing groove formed on the ring.

The operation of the igniter cap which has just been described with reference to figures 2 to 5 is essentially the following.

A first action of pressure on the lever 40, for moving it closer to the axis O-O, must be carried out to release the aforementioned complementary-shape means and thus release the ring 120.

5 Then, a second movement of rotation of the ring 120 about the axis O-O, allows the aperture 125 to be positioned angularly facing the spoon or lever 40 and thus to release the lever 40, as illustrated in figure 3.

10 Upon throwing, the spoon 40 retracts as can be seen in figure 5, under the influence of the biasing of the latch 30 which is ejected, allowing the movement of the striker 20 under the influence of its associated spring 22, pre-biased for storage to store the necessary energy for driving the striker 20, which initiates the primer 14.

The consecutive implementation of the pyrotechnic train is conventional per se.

15 The igniter cap conforming to this embodiment of the present invention thus requires two distinct movements. More precisely, according to the first embodiment illustrated in figures 2 and 3, these two movement comprise a first retracting movement of the spoon 40 to allow the rotation of the ring 120, which constitutes a first safety, operated by the nominal action of gripping the grenade, and the second
20 movement is a rotation of the ring 120 to align the upper part of the spoon 40 with the notch 125 of the ring 120.

The embodiments shown beginning with figure 6 will now be described.

25 Unlike the first embodiment illustrated in figures 2 to 5, which require activation/retraction of the spoon 40, then a rotation of the ring 120 to carry out implementation, the embodiments illustrated in figures 6 and subsequent demand at least a dual activation/displacement of the ring: translation of the ring 120 along the axis O-O followed by a
30 rotation of the ring 120 about the axis O-O.

Moreover, according to the fourth embodiment illustrated in figures 28 to 31, a biasing of the arming lever 40 in an intermediate step between traction and rotation of the ring 120, is also required.

The complementary-shape means are suitable for imposing the aforementioned composite movement of the ring 120, translation then rotation, to allow the alignment of the aperture 125 facing the spoon 40.

Many complementary-shape means can be provided for this purpose.

According to non-limiting embodiments illustrated in figures 11 and 12, these complementary-shape means comprise at least one peg protruding on one of the igniter cap body 110 or the ring 120 and a complementary groove formed on the other of the ring 120 or the igniter cap body 110, which groove includes two orthogonal segments, one parallel to the axis O-O and the other transverse to this axis O-O.

According to the variant illustrated in figure 11, the peg 111 is formed on the body 110 and the groove 126 formed on the inner surface of the skirt 123 comprises two segments 127 and 128.

According to the variant illustrated in figure 12, the peg 129 is formed protruding on the inner surface of the skirt 123 and the groove 116 formed on the body 110 comprises two segments 117 and 118.

The operation of the embodiment illustrated in figures 6 to 10 remains similar overall to that previously described for the first embodiment with reference to figures 2 to 5.

This embodiment corresponds to a case with on-board energy for activating a striker 20, i.e. the spring 22 associated with the striker 20 is pre-biased at rest to store the energy necessary to ensure the striking of the cap by the striker 20 when the latch 30 is withdrawn.

At rest, the grenade is in the position illustrated in figure 7.

First of all, the ring 120 must be driven in translation along the axis O-O moving away from the body 60 as illustrated in figure 8.

Then in a second time, the ring 120 is driven in rotation about the axis O-O to align the aperture 125 with the spoon as illustrated in figure 9.

As illustrated in figure 10, the spoon 40 is then ejected to allow activation of the pyrotechnic train if the grenade is thrown at this stage.

Shown in figure 6 is an optional spring 130 centered on the axis O-O and operating in traction between the body 110 and the ring 120, to bias the ring 120 in its initial rest position pressed against the body 110 of the igniter cap to limit the risks of accidental activation of the
5 igniter cap.

The embodiment illustrated in figures 13 to 26 will now be described.

Found again in the embodiment shown in figures 13 to 26 is a body 60 which accommodates a working charge 62 and on the mouth of
10 which is screwed an igniter cap 100.

The igniter cap 100, without the spoon, comprises a body 110 which accommodates and carries a pyrotechnic train 10 comprising a detonator 12, a primer 14 associated with a delay composition 16, a striker 20 associated with a spring 22, a latch 30 and an arming lever
15 40, also called a spoon.

The igniter cap 100 also comprises a ring 120 which includes an aperture 125, which ring 120 is movable between a locking position in which the aperture 125 is misaligned with respect to the spoon 40 so that the latter cannot be released and an activation position, obtained
20 by two successive movements of translation along the axis O-O, then of rotation along this axis O-O in which the aperture 125 is aligned with the spoon 40 to allow its release and consequently the initiation of the pyrotechnic train 10.

The aforementioned dual movement, translation then rotation, of
25 the ring 120 is controlled by complementary-shape means of the type illustrated in figures 11 and 12, or equivalent means.

However, this embodiment illustrated in figures 13 to 26, corresponds to a case with no on-board energy for activation of the striker 20. In other words, depending on the embodiment illustrated in
30 figures 13 to 26, the spring 22 associated with the striker 20 is not biased at rest so that it does not store energy capable of displacing the striker 20. In this case, the spring is not constrained until the moment of the translation of the ring 120. This disposition allows the safety of

the igniter cap, and of the grenade thus equipped, to be further reinforced.

To this end the spring 22, operating in compression, is placed between an abutment 115 formed on the body 110 and directed toward
5 the center of the body 60, and a collar 25 connected to the inner end of the striker 20.

The striker 20 is moreover connected by temporary connection means 200, which will be described in more detail hereafter, with the ring 120. Thus, the spring 22 is compressed when a traction is
10 performed on the ring 120, moving the aforementioned collar 25 closer to the aforementioned abutment 115.

Depending on the embodiment shown in figures 13 and subsequent, the temporary connection means 200 comprise an expandable claw 210 connected to one of the ring 120 or the striker 20,
15 which cooperates with an attachment ball joint 29 connected to the other of the striker 20 or the ring 120.

The claw 210 can be formed for example from at least two expandable jaws evenly distributed about the axis O-O.

This expandable claw 210 cooperates with a drawer 220. The
20 function of the drawer 220 is to prohibit the expansion of the claw 210 as long as the spoon 40 is in place.

The drawer 220 is preferably placed between the latch 30 and the cap 121 of the ring 120.

Preferably the drawer 220 is mounted in radial translation in the
25 body 110 perpendicularly to the axis O-O facing the end of the spoon 40 close to its axis of rotation 42. The drawer 220 is biased radially outward by a spring 222. At rest, however, the radially outward end of the drawer 220 rests against the inner face of the spoon 40 so that the drawer 220 cannot be ejected radially. On the other hand, the drawer
30 220 is ejected when the spoon 40 is retracted.

The striker 20 is mounted in translation in a central bore 119 of the body 110, centered on the axis O-O.

The drawer 220 includes a longitudinal through hole 224, secant of the bore 119. The width of the hole 224 is preferably equal to the diameter of the bore 119 and equal to the transverse dimension of the claw 210 in the retracted position, i.e. the dimension of the claw 210 clamped on the ball joint 29 considered transversely to the axis O-O.

It will be understood that thus, as long as the claw 210 is accommodated in the bore 119 or in the hole 224 of the drawer 220, the claw cannot expand and consequently the ball joint 29 remains held by the claw 210 so that the striker 20 remains connected to the ring 120.

On the other hand, when, under the conditions which will be described hereafter, the drawer is ejected, the claw 210 is no longer confined by the hole 119 and can expand under the bias of the spring 22 associated with the striker 20, constrained at that time.

According to the particular embodiment shown in figures 13 and subsequent, the expandable claw 210 is formed on the end of a rod 129 formed integrally on the inner face of the wall 121 and centered on the axis O-O.

The operation of the igniter cap illustrated in figures 13 to 27 is essentially the following.

At rest, the grenade is in the position illustrated in figures 13, 17 and 23. The spring 22 associated with the striker 20 is not constrained. The latch 30 prohibits striking. The claw 210 is confined in the bore 119 and cannot expand.

At first, the ring 120 must be driven in translation along the axis O-O moving away from the body 60 as is illustrated in figure 14. As illustrated in figures 18 and 24, the claw 210 which holds the ball joint 29 drives the striker 20. The spring 22 associated with the striker 20 is then constrained. The claw 210 is now positioned in the hole 224 of the drawer 220. It therefore remains confined.

Then secondly, the ring 120 is driven in rotation about the axis O-O to align the aperture 125 with the spoon 40 as illustrated in figure 15. As illustrated in figures 19 and 25, the claw 210 remains positioned in the hole 224 of the drawer 220 and still holds the ball joint 29. The

latch 30 still provides the mechanical safety of the grenade because it interferes with the path of the striker 20 and prevents it from striking the primer 14.

5 As illustrated in figures 16, then 20 and 21, the spoon 40 is then ejected to allow the activation of the pyrotechnic train if the grenade is thrown at this stage. As illustrated in figure 20, 21, 22, and 26, the drawer 220 is then ejected. The claw 210 is finally positioned in the volume previously accommodating the drawer 220. It can expand and release the ball joint 29.

10 Under the influence of the spring 22, previously constrained during traction of the ring 120, the striker 20, released by the separation of the ball joint 29 and by the claw 210, can strike the primer 14 to initiate the pyrotechnic train.

15 The embodiment illustrated schematically in figure 27 differs from the embodiment previously described with reference to figures 13 to 26 only by the fact that according to figures 13 to 26 the latch 30 is engaged in a longitudinal through hole of the striker, the striking end of the striker 20 being placed facing the primer 14, in other words on the side of the latch 30 situated toward the primer 14, so that the striker 20
20 extends at rest on either side of the latch 30, whereas according to the embodiment illustrated in figure 27, at rest the latch 30 is interleaved between the striker 20 and the primer 14 so that the striking end of the striker 20 is placed resting against the latch 30.

25 It will be observed that the means conforming to the invention, previously described, offer the advantages of safely imposing gripping of the grenade because they impose holding the spoon 40 in the palm of the hand, without increasing complexity or extending execution.

It will also be noted that the invention offers complete reversibility as long as the spoon is not released. In fact, a ring 120 can
30 be displaced in the reverse direction and be brought back into the safe storage position as long as the spoon is not ejected.

Illustrated in figure 28 to 31 is a variant embodiment of the second embodiment illustrated in figures 7 to 11 or of the third

embodiment illustrated in figures 14 to 23, which constitutes a fourth embodiment conforming to the present invention and which is characterized by the presence of complementary-shape means provided respectively on the ring 120 and on the spoon 40 to impose that the
5 lever or spoon 40 is retracted in an intermediate step between a first step during which the ring 120 is translated by pulling and a last handling step during which the ring 120 must be turned to align its aperture 125 with the lever 40.

Typically, as illustrated in figure 28, the aforementioned
10 complementary-shape means can comprise a groove 1200 formed in the inner surface of the skirt 123 and complementary to the spoon 40, or a protruding rib on the spoon 40 and suitable to receive it at rest. To release the ring 120 in rotation, the spoon 40 should be disengaged from the complementary groove 1200 formed facing it on the ring 120.

15 Alternatively, these complementary-shape means can be formed as shown schematically in figure 4, from two longitudinal ribs 122, 124 protruding on the inner face of the skirt 123 of the ring 120 and which frame the spoon 40. As long as the spoon 40 is situated between these two ribs 122 and 124, the ring 120 cannot be driven in rotation about
20 the axis O-O. It is necessary to disengage the spoon 40 from these two ribs 122 and 124 by moving the spoon closer to the axis O-O to allow the rotation of the ring 120.

Moreover, the structure and the operation of this fourth embodiment remain generally identical to those describe previously for
25 the second and third embodiments.

Of course, the present invention is not limited to the embodiments just described, but extends to all variations conforming to its spirit.

For example, according to a variant embodiment, the igniter cap
30 can optionally include an initial rupture of the pyrotechnic train formed by a physical separation between the primary explosive means and the secondary explosive means, which rupture of the pyrotechnic train is

neutralized to eliminate the physical separation between the primary explosive means and the secondary explosive means during arming.

Moreover, the striker previously described can be replaced by a rotary striker.

- 5 If appropriate, the igniter cap can be directly integrated in the grenade and not formed of a component suitable to be added to a grenade.

10 It will be observed that the igniter cap conforming to the present invention can be implemented by rotation of the ring 120 in one direction or in the reverse direction. The igniter cap conforming to the present invention is therefore suited to any user, whether right-handed or left-handed.

The igniter cap therefore has an ambidextrous nature.

15 This ambidextrous nature can in particular be accomplished if, at rest, the aperture 125 is disposed at 180° from the lever 40. In this case in fact the angle of rotation of the ring 120 to bring the aperture 125 facing the lever 140 is identical and equal to 180° regardless of the direction of rotation of the ring 120.

20 As a variant, to ensure a perfectly ambidextrous character while limiting the angle of rotation required for the ring 120, at least two symmetric apertures 125 can be provided with respect to the position of the lever 40 at rest.

CLAIMS

1. An igniter cap, comprising a spoon (40), a pyrotechnic train (10) and a striker (20) suitable for initiating the pyrotechnic train (10) after release of the spoon (40), characterized by the fact that the igniter cap further comprises a ring (120) including at least one aperture (125) and movable between a locking position in which the aperture (125) is misaligned with respect to the spoon (40) so that it cannot be released and an activation position in which the aperture (125) is aligned with the spoon to allow its release.

2. The cap according to claim 1, characterized in that it comprises means which impose at least two distinct operations or displacements to allow the displacement of the ring (120) between its locking position and its activation position.

3. The cap according to one of claims 1 or 2, characterized in that it comprises means which impose pressing on the spoon (40) at one moment of the arming phase, to ensure the initiation sequence.

4. The cap according to one of claims 1 to 3, characterized in that the ring (120) is rotatably mounted about the main axis (O-O) of the igniter cap.

5. The cap according to one of claims 1 to 4, characterized in that the ring (120) is composed of a wall (121) in the form of a disk, extended by a cylindrical skirt (123) including said aperture (125), the skirt (123) constituting the external portion of the igniter cap, directly accessible for manipulation.

6. The cap according to one of claims 1 to 5, characterized in that the aperture (125) has a width at least equal to the width of the spoon (40).

7. The cap according to one of claims 1 to 6, characterized in that it comprises a latch (30) slidably mounted in the cap, limited initially in displacement by the spoon (40) and which interferes with the displacement path of the striker (20) so that the striker cannot initially strike a primer (14) of the pyrotechnic train.

8. The cap according to one of claims 1 to 7, characterized in that it comprises complementary-shape means provided respectively on the spoon (40) or a cap body and on the inner face of the ring (120) to prohibit any initial rotation of the ring (120).

5 **9.** The cap according to claim 8, characterized in that the complementary-shape means comprise means of the complementary rib/groove type provided respectively on the spoon (40) or a cap body and on the ring (120), for example in the form of two longitudinal ribs (122, 124) protruding on the inner face of the skirt (123) of the ring
10 (120) and which frame the spoon (40) or in the form of at least one rib protruding on the spoon (40) and suitable for entering, at rest, into a complementary facing groove formed on the inner surface of a skirt (123) of the ring (120).

10. The cap according to claim 8, characterized in that the
15 complementary-shape means comprise means suitable for imposing a composite movement of the ring (120), translation then rotation, to allow the alignment of the aperture (125) facing the spoon (40).

11. The cap according to claim 10, characterized in that the
20 complementary-shape means further comprise means suitable to impose pressing on the spoon (40) after the translation movement of the spoon (40) and the rotation movement of the spoon (40), to allow the alignment of the aperture (125) facing the spoon (40).

12. The cap according to one of claims 10 or 11, characterized in that the complementary-shape means comprise at least one peg
25 protruding on one of the igniter cap or the ring (120) and a complementary groove formed on the other of the ring (120) or the igniter cap, which groove includes two orthogonal segments, one parallel to the axis O-O and the other transverse to this axis O-O, for example a peg (111) formed on the cap and a groove (126) formed on the inner
30 surface of a skirt (123) of the ring, comprises two segments (127, 128) or a peg (129) formed protruding on the inner surface of the skirt (123) and a groove (116) formed on the cap and which comprises two segments (117, 118).

13. The cap according to one of claims 1 to 12, characterized in that it further comprises a drawer (220) mounted in radial translation in a body (110) of the cap, facing the spoon (40) and which includes means (224) ensuring a connection of the striker (20) with the ring (120) as long as the spoon (40) is not ejected.

14. The cap according to one of claims 1 to 13, characterized in that the striker (20) is connected by temporary connection means (200), with the ring (120).

15. The cap according to claim 14, characterized in that the temporary connection means (200) comprise an expandable claw (210) connected to one of the ring (120) or the striker (20), which cooperates with an attachment ball joint (29) connected to the other of the striker (20) or the ring (120).

16. The cap according to claim 15, characterized in that the claw (210) is formed by at least two expandable jaws evenly distributed about the translation axis (O-O) of the striker (20).

17. The cap according to claims 13 and 15 taken in combination, characterized in that the drawer (220) includes a hole (224) of which the width is equal to the transverse dimension of the claw (210) in the retracted position.

18. The cap according to one of claims 1 to 17, characterized in that it comprises guide means such that the spoon (40) must be retracted at first, then the ring (120) must be turned to align its aperture (125) with the spoon (40) in a second time.

19. The cap according to one of claims 1 to 17, characterized in that it comprises guide means such that the ring (120) must be translated by pulling at first, then be turned in a second time to align its aperture (125) with the spoon (40).

20. The cap according to one of claims 1 to 17 and 19, characterized in that it comprises guide means such that the ring (120) must be translated by pulling at first, then the spoon (40) must be retracted in a second time and finally, in a third time, the ring (120) must be turned to align its aperture (125) with the spoon (40).

21. The cap according to one of claims 1 to 20, characterized in that it comprises a spring (22) associated with the striker (20) and that the spring (22) is biased during displacement in translation of the ring (120) so that the spring (22) stores during this displacement the energy
5 necessary for the implementation of the striker (20).

22. The cap according to one of claims 1 to 21, characterized in that the aperture (125) is disposed at rest at 180° from the spoon (40).

23. The cap according to one of claims 1 to 21, characterized in that it comprises at least two apertures (125), symmetrical with respect
10 to the position of the spoon (40) at rest.

24. A grenade equipped with an igniter cap conforming to one of claims 1 to 23.