

Description

The invention relates to a safety mechanism for a spinning projectile fuse, comprising:

- a ball-shaped rotor which can be rotated out of a safety position into an armed position;
- a bearing body and a guide disc, between which the rotor is rotatably mounted;
- a first ring-shaped groove in the bearing body, said groove being located in a plane perpendicular to the axis of the projectile;
- a second ring-shaped groove in the ball-shaped rotor, said groove being located, in the safety position of the rotor, in a plane perpendicular to the axis of the projectile;
- a safety spring in the form of a ring-shaped disc which protrudes into both the first groove and the second groove to secure the rotor in its safety position, and which can be deformed by the firing acceleration and by the projectile spin to release the rotor into its armed position.

According to US-A-3,595,169, one known delayed-action fuse of this type comprises a ball-shaped rotor rotatably mounted in a cavity in the fuse casing. The firing pin, said cavity and the booster charge are situated on the fuse axis. The rotor contains a primer in a through-hole in the rotor, and a disc-shaped ring, which protrudes into a groove in the rotor, maintains the rotor and primer in a safety position. For the rotor to be released into its armed position, the disc-shaped ring has to be pressed flat by the firing acceleration and expanded by the projectile spin.

However, this known locking ring does not guarantee adequate safety during transportation. Should vibrations

occur while the projectile equipped with such fuses is being transported, it would be possible for the rotor to rotate into its activated position.

One known safety mechanism for spinning projectiles of this type, according to German Auslegeschrift (examined patent application) 25 39 750, comprises a horseshoe-shaped safety element which even just the projectile spin can deform to a point where it can be rotated into its armed position. Such a safety element does not meet the safety requirements frequently set for such safety mechanisms.

The object to be achieved by the present invention is to provide a safety mechanism that complies with the safety regulations, meaning that the safety element should not release the rotor until two forces independent of one another, e.g. firing acceleration and projectile spin, act upon the safety element. Moreover, safety during transportation must be guaranteed.

The safety mechanism according to the invention is characterised in that the ring-shaped disc (31) is sub-divided by cut-outs (32,33) into segments (34-39), said successive segments (34-39) being alternately upwardly and downwardly directed in a wave-shaped configuration.

One working example of the safety mechanism according to the invention will now be described in detail with reference to the drawing, in which:

Fig. 1 shows a longitudinal section through a base fuse in the safety position;

Fig. 2 a view of a safety spring from above, and

Fig. 3 a view of the same safety spring from the side.

According to Fig. 1 the base fuse has a substantially cylindrical casing, adapted to be screwed by an external thread 11 into a projectile body (not shown) of a spinning projectile.

A bearing body 12 is screwed into a bore 13 in said casing 10, said bore 13 exhibiting a shoulder 14 against which a guide sleeve 15 rests. On this guide sleeve 15 is seated a guide disc 16 which the bearing body 12 presses against guide sleeve 15, thereby immobilising said parts in the casing 10. A hammer sleeve 17 is displaceably located with its lower part in the guide sleeve 15 and with its upper part in the guide disc 16. A firing pin 18 is fixed to the upper part of the hammer sleeve 17. In the bearing body 12 is located a ball-shaped rotor 19, containing a primer 20. The rotor 19 can be rotated by projectile spin from the safety position shown and into the activated position. Also fixed to the bearing body 12 is a booster charge 21, which protrudes into the bursting charge (not shown) of the projectile body.

A disassembly spring 22 rests with one end against the base of the casing 10 and with its other end against the hammer sleeve 17, and tries to thrust hammer sleeve 17 with firing pin 18 against the primer 20. This displacement is prevented by a plurality of locking elements 23 which rest with one end against the guide disc 16 and with the other end against a shoulder 24 of hammer sleeve 17. A bolt 25 is situated inside disassembly spring 22 and serves to guide the latter. The segment-shaped locking elements 23 are held together by a centrifugal band 26 comprising a thin metal strip wound around the locking elements 23. The hammer sleeve 17 is furthermore prevented from moving by ball-shaped centrifugal bodies 27

located in radial bores 28 in the hammer sleeve 17 and resting, under the action of the projectile spin, against a conical surface 29 on the inside of guide sleeve 15. Behind the hammer sleeve 17 there is arranged an inertia body 30 in the casing 10.

In accordance with the invention, beneath the rotor 19 is provided a further safety spring 31 in the form of a ring-shaped disc, which secures the rotor 19 against rotating into its activated position before the projectile has been fired.

The shape of this disc 31 can be seen from Figs. 2 and 3. In Figs. 2 and 3 a ring-shaped disc 31 is sub-divided by three inner cut-outs 32 and two outer cut-outs 33 into six segments 34, 35, 36, 37, 38, 39, disc 31 being open at position 40. Viewed from this position 40, segments 38 and 39 are directed upwards in Fig. 2. The segments which follow, 36 and 37, are inclined downwards and finally the last two segments, 34 and 35, are again directed upwards. Cut-outs 32 and 33 so attenuate safety spring 31 that the firing acceleration enables said six segments to fold flat in one plane and the projectile spin enables the opened ring to expand.

In Fig. 1 ball-shaped rotor 19 exhibits a ring-shaped groove 41, into which the ring-shaped safety spring 31 projects. In addition the bearing body 12 exhibits a groove 42, enlarged in the lower region of safety spring 31 to allow the safety spring to expand radially as soon as it is pressed flat.

The foregoing fuse operates as follows:

When the projectile (not shown) is fired, the firing acceleration presses safety spring 31 flat and the latter

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bears against guide disc 16. Moreover, the projectile spin causes safety spring 31 to expand and rotor 19 to rotate out of the safety position shown in Fig. 1 and into the activated position, in which the axis of the primer 20 coincides with the axis of the projectile; this means that the firing pin is able to prick the primer 20. The projectile spin also causes centrifugal band 26 to unwind from the position shown in Fig. 1 until it bears against the inside wall of guide sleeve 15, causing the locking elements 23 to move from their locking position into the release position. Hammer sleeve 17 is then only retained by the centrifugal bodies 27, which under the action of the projectile spin bear against the conical surface 29 of guide sleeve 15 and thereby prevent the primer 20 from being pricked by the firing pin 18.

Upon percussion of the projectile, the inertia body 30 and the hammer sleeve 17 are accelerated forwards. Inertia body 30 thus drives hammer sleeve 17, causing the firing pin 18 fixed to the hammer sleeve 17 to strike the primer 20 at the required speed.

The rotor 19 is above all secured against accidentally rotating into its armed position by the six corners, labelled A and B, of the ring-shaped disc 31 shown in Fig. 3. The disc 31 rests by its outer corners A in the groove 42 of the bearing body 12, and by its inner corners B the disc 31 rests in the groove 41 of the rotor 19, thereby preventing the rotor 19 from rotating accidentally.



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Claims

1. A safety mechanism for a spinning projectile fuse, comprising:

- a ball-shaped rotor (19) which can be rotated out of a safety position into an armed position;
- a bearing body (12) and a guide disc (16), between which the rotor (19) is rotatably mounted;
- a first ring-shaped groove (42) in the bearing body (12), said groove being located in a plane perpendicular to the axis of the projectile;
- a second ring-shaped groove (41) in the ball-shaped rotor (19), said groove being located, in the safety position of the rotor, in a plane perpendicular to the axis of the projectile;
- a safety spring in the form of a ring-shaped disc (31) which protrudes into both the first groove (42) and the second groove (41) to secure the rotor (19) in its safety position, and which can be deformed by the firing acceleration and by the projectile spin to release the rotor (19) into its armed position,

characterised in that the ring-shaped disc (31) is subdivided by cut-outs (32,33) into segments (34-39), the successive segments (34-39) being alternately upwardly and downwardly directed in a wave-shaped configuration.

2. Safety mechanism according to Claim 1, characterised in that the ring-shaped disc (31) exhibits web members formed by the cut-outs (32,33), said web members ensuring deformation by the firing acceleration and projectile spin.

3. Safety mechanism according to Claim 1, characterised in that said cut-outs (32,33) form support points on the



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disc (31) by means of which the rotor (19) is retained in its safety position.

4. Safety mechanism according to Claim 2, characterised in that it exhibits two ring-shaped outer cut-outs (33) and three inner cut-outs (32), and that the inner cut-outs (32) form web members which can be deformed by projectile spin.