

DESCRIPTION

The invention relates to a base fuze for barrel weapon projectiles having impact function.

A base fuze for barrel weapon projectiles having impact function is known from DE 35 35 864.8 A1. In this case a spring-actuated striker pin is secured in the safe position by way of a mechanical delay mechanism inside a housing. The delay mechanism consists of a safety sleeve having blocking balls mounted in bores, of a sleeve, coupled by way of the blocking balls, of the striker pin and of recesses, arranged axially offset with regard to the blocking balls in the safe position in the fuze housing, for the reception of the blocking balls. A working spring for the acceleration of the striker pin lies between the striker pin and a base of the safety sleeve. In the case of lightly armoured targets the delay mechanism brings about the delayed detonation of the projectile in the interior of the target. The delay time is achieved in that, upon the penetration of a projectile into the target, the striker pin with the safety sleeve carries out a so-called idle stroke in the detonation direction, in which respect the blocking balls pass into the recesses of the housing. The thereby unlocked blocking sleeve is shifted back into the initial position by the biased working spring. Only in this initial position is the working spring in a position to propel the striker pin in the detonation direction. The so-called detonation delay time is achieved as a result of the described movement cycles.

The constructional expenditure is, in this respect, very high. Above all, the fuze needs a relatively great over-all length in the axial direction.

The problem of the invention consists in providing a base fuze having impact function which has a considerably shorter over-all length than the base fuze described at the beginning hereof.

The invention solves this problem in accordance with the characterising features of the main claim.

The fuze in accordance with the invention advantageously consists of few parts and is therefore inexpensive. Moreover, the over-all length is shorter than in the case of the base fuze discussed at the beginning hereof. In the case of a projectile there therefore exists a considerable larger interior space for the reception of the explosive. In this way increased explosive force is available.

It is also important that the puncture energy of the striker pin in the case of relatively thin targets has the necessary degree for a specific and reliable firing of a detonator. In this respect, the necessary time for the detonation delay is ensured. The detonation of the detonator

is effected only after expiry of a certain time as from impact, thus in the interior of a thin target, such as an aircraft structure, or lightly armoured land vehicles. The delay time corresponds to the time which the blocking balls need only to pass out of a secured position into a working position.

In a surprisingly simple manner the path of the striker pin is defined by twice the diameter of the blocking balls.

The invention is usable in the case of spin and low-spin projectiles and flying bodies.

An exemplified embodiment of the invention is shown in the drawings.

Fig. 1 shows an extract of a base fuze, shown in a simplified manner, in the "safe" position

Fig. 2 shows the base fuze in accordance with Fig. 1 in the firing position

Fig. 3 shows a detail III in accordance with Fig. 1.

A base fuze 1 consists of a housing 2 with a rotor housing 3, a plate 4 and of a cup-shaped base 5 with a collar 9.

A rotor 10 with a puncture-sensitive detonator 11 and a centrifugal safety device 12 are mounted movably in the rotor housing 3. A main axis of the fuze 1 is designated by 14.

A striker pin 20 with a tip 21, collar 22, working spring 23, pin 24 and riveted-on foot plate 25 is mounted in bores 6 to 8.

The base 5 supports, in recesses 51, 52 having an edge 15 and surface 17, a hold-back spring 53, a blocking disc 54 and blocking balls 55.

The working spring 23 and the hold-back spring 53 are installed in the biased state and designed as compression springs. The spring force of the working spring 23 is at least ten times greater than that of the hold-back spring 53.

A spin projectile, not shown, provided with the base fuze 1 is brought in a weapon barrel to its muzzle velocity and rotation.

After leaving the weapon barrel the rotor 10 is unlocked in a manner which is not shown. The detonator 11 is in accordance with Fig. 2 in the live position. The centrifugal safety device 12 has in accordance with Fig. 2 released the striker pin 20 for the axial stroke and this remains, as a result of the hold-back spring 53, in the position shown. The deceleration of the projectile contrary to the direction of the arrow 13 during flight has no effect on the released

striker pin 20. The working spring 23 and the striker pin 20 are secured by way of the hold-back spring 53 and the blocking disc 54 in accordance with the position in Fig. 1.

During the penetration procedure into a lightly armoured target the projectile is decelerated. As a result of the deceleration of the projectile and the mass moment of inertia of the functional parts the striker pin 20 with blocking disc 54 and blocking balls 55 moves forward in the direction of the arrow 13, see also Fig. 2. The blocking balls 55 slide over the edge 15 and radially outwards. The blocking disc 54 carries out a stroke 16 which corresponds to the diameter of the blocking balls 55. The delay time until detonation corresponds approximately to the time which is needed for the stroke 16 of the blocking disc 54.

Two movement cycles are crucial for the delay time.

1. The stroke 16 with the blocking balls 55 sliding on a wall 56 of the recess 52.

The blocking balls 55 are, by reason of their mass and of the spin of the projectile, forced against the wall 56. The friction between the blocking balls 55 and the wall 56 decelerates the stroke 16 of the striker pin 20.

2. The friction of the blocking balls 55 between the foot plate 25 and the blocking disc 54 when the blocking balls 55 slide off over the edge 15.

The relatively high bias of the working spring 23 clamps the blocking balls 55 between the foot plate 25 and the blocking disc 54. The radially acting inertia forces overcome the friction forces, so that the blocking balls 55 leave the foot plate 25 in order to apply themselves to a wall 57 of the recess 51. As soon as the blocking balls 55 in accordance with Fig. 3 have left a clamping region 26 on the foot plate 25, an edge 27 accelerates, additionally to the radial inertia forces, the blocking balls 55, i.e. the blocking balls 55 are flung out of the clamping region 26 of the foot plate 25 and of the blocking disc 54.

The friction of the blocking balls 55 in the clamping region 26 is therefore the second factor for the delay time.

As soon as the blocking balls 55 have left the foot plate 25, the working spring 23 propels the striker pin 20 into the detonator 11 until the foot plate 25 strikes against the blocking disc 54.

The delay time is considerably less in the case of a more strongly armoured target. This is defined in that the striker pin 20 from the "safe" position shown in Fig. 1 by reason of the mass moment of inertia of the striker pin 20 needs a certain time until it punctures the detonator 11. What is crucial is a so-called set connected to the striker

pin 20, consisting of blocking disc 54, blocking balls 53 and foot plate 25. The friction of the blocking balls 55 against the wall 56 of the recess 52 in the region of the length of path 58 furthermore acts in a time-delaying manner. The working spring 23 in this respect does not become effective.

In order, in the case of thin targets, to achieve a shorter delay time, instead of the edge 15 a cone surface 30 shown in dot-dash lines and an edge lying in a region 28 can be provided. Each individual measure already brings about a shorter delay time.

On the other hand, a longer delay time can be achieved in the case of a thin target by a larger region 26 and/or by a lengthened length of path 58 for the blocking balls 55.

A specific depth of penetration of the tip 21 in the detonator 11 is necessary for the reliable puncturing of the detonator 11.



CLAIMS

1. A base fuze (1) for barrel weapon projectiles having impact function with a detonator (11), a spring-actuated striker pin (20), a mechanical delay mechanism (15, 16, 52, 55) which has blocking balls (55) which in their blocking position secure the striker pin (20) in a form-locking manner with respect to a blocking member (54) which is axially displaceable in a recess (51) of the housing (5), characterised in that the blocking member is designed as a blocking disc (54), the blocking disc (54) at the base side together with a smaller striker-pin-sided foot plate (25) clamps the blocking balls (55) between them through the force of a working spring (23) on the striker pin (20), the blocking disc (54) butts through the force of a hold-back spring (53) against a base-sided collar (9), and a housing-sided recess (52) bounds the blocking balls (55) radially, in which respect the working spring (23) is supported against a collar (22) of the striker pin (20) and the hold-back spring (53) is supported against a housing-sided plate (4).

2. A base fuze according to claim 1, characterised in that the wall (56) of the recess (52) is coaxial with the main axis (14) of the fuze (1) and in the detonation direction (13) an edge (15) is provided as the transition to a surface (17) lying at right angles to the main axis (14), and on the foot disc (25) a clamping region (26) projecting radially beyond the blocking balls (55) is provided.

3. A base fuze according to claim 1, characterised in that the spring force of the working spring (23) is approximately ten times greater than that of the hold-back spring (53).