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SAFETY DEVICE FOR TIME FUZES

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Fig.1

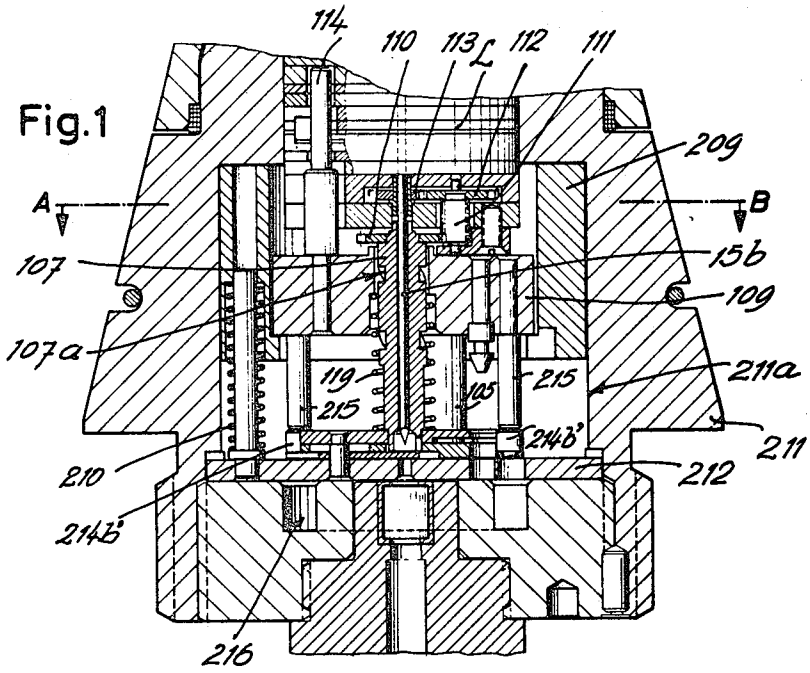


Fig.2

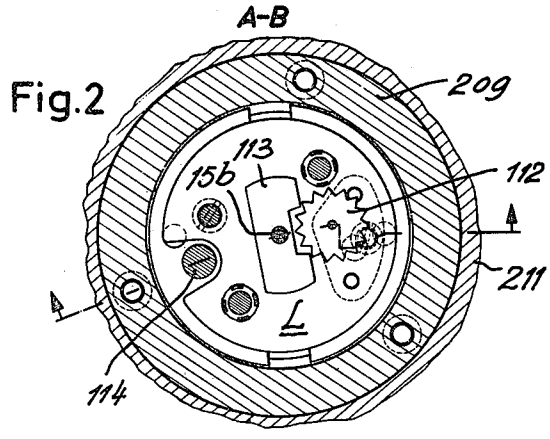


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Fig.3

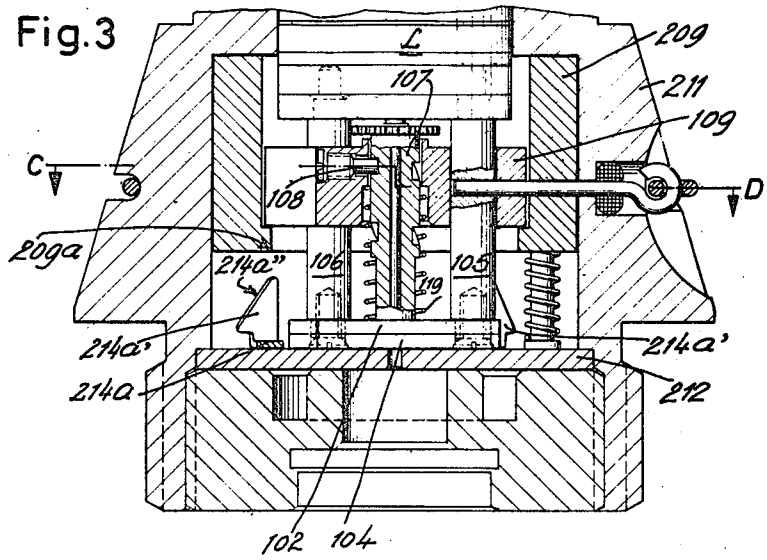


Fig.4

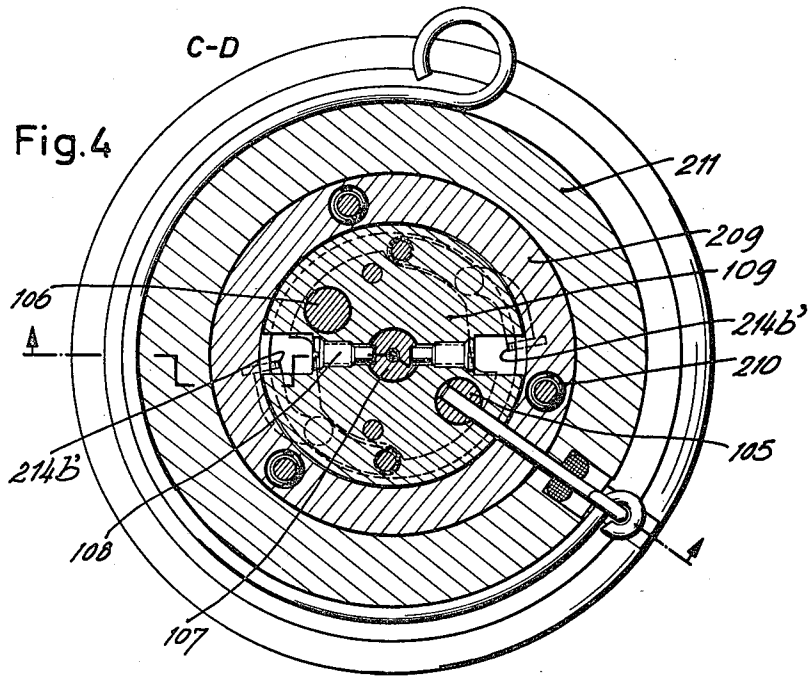


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Fig. 5

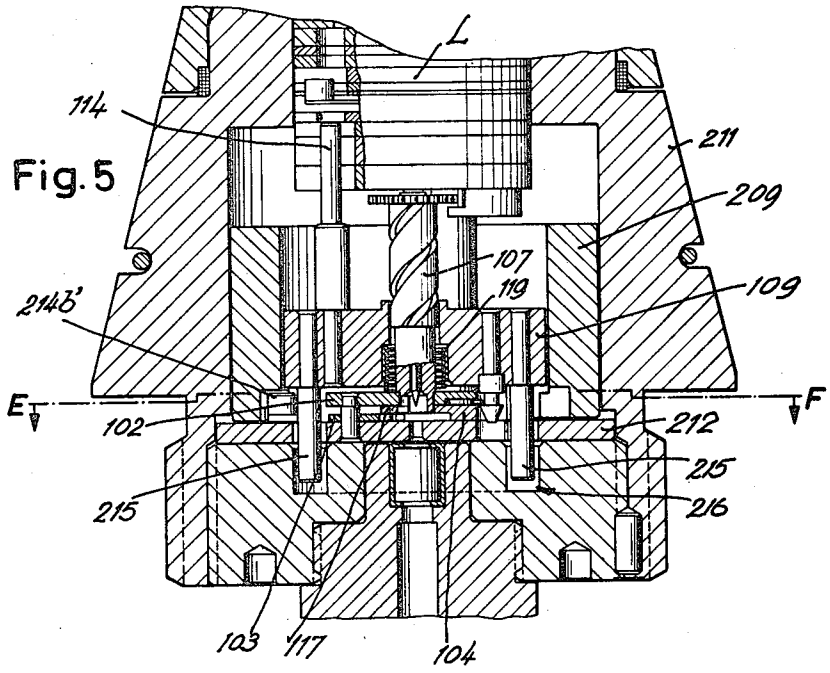



Fig. 6

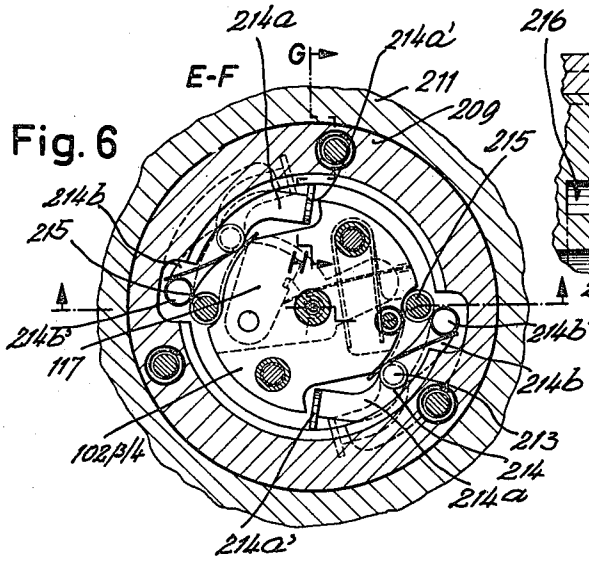
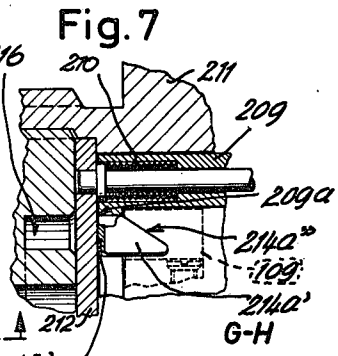



Fig. 7

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# SAFETY DEVICE FOR TIME FUZES

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Int. Cl. F42c 1/04
U.S. Cl. 102—78 1 Claim

## ABSTRACT OF THE DISCLOSURE

A time fuze for a projectile having a safety device including an inertia weight mounted around a cylindrical member which carries a striker pin stem movable therein and a second inertia weight is associated with the first inertia weight so that together they increase the safety factor for the fuze.

The invention relates to a further development of the time safety device for a time and percussion fuze for projectiles with low acceleration, with and without twist, especially for rocket projectiles according to Patent No. 3,124,074. In that case, a cylindrical body, provided at its periphery with a helical groove on the pin bolt, can be driven through an inertia weight provided with a cross bolt meshing with the helical groove, which is guided non-rotatably in the fuze housing and carries a safety finger parallel to the axis, which secures the balance-speed regulator of the time mechanism.

With the present further development of this time fuze, an increase of safety, both during transport as well as after firing, is striven for. Fuzes according to the type pertinent here, as well as the fuze according to Patent No. 3,124,074, are customarily secured during transport by means of a safety pin. It can happen that, after the pin has already been drawn, the projectile will still be transported once more or further. If in that case, it will drop hard onto the shell base, the fuze which, according to supposition, is intended for projectiles with low acceleration and, therefore, for fuzes that can start easily, may become armed. It is the object of the present invention to prevent this latter. This is solved in that a second inertia weight, movable in the same direction as the first, will be connected in series with the first inertia weight and in that a disconnectable lock has been arranged at the end of the path of its return travel, which lock will block the first inertia weight in its rest position. If now the projectile is accidentally dropped hard onto its shell base, then the parallel inertia impulse will merely cause a retreating of the second inertia weight, held in its starting position by feed springs, whereby, however, it will not reach the end of its return path and therefore is unable to release the lock which blocks or holds the first inertia weight in its rest position. Therefore, the falling impulse has passed away before the actual inertia drive for the time fuze could become operable. In the further development of the fuze according to Patent No. 3,124,074 and according to the invention, it is not only the safety factor during transport but also safety with regard to time which will be fulfilled since the action times of the two inertia weights connected in series are added up together.

In the case of a preferred design of the invention, the second inertia weight has been developed as a ring movable with regard to the feed springs and encompassing the first weight, having the same center. For practical purposes, it is inserted into a cylindrical bore of the central member of the fuze, and in its rest position, it partially encompasses the likewise cylindrical body of the drive



mechanism built up on supporting columns above the base of the fuze. For blocking the first inertia weight, double levers, which can swing out radially on the base of the drive mechanism, will be arranged advantageously, which has on one arm a bend which is directed forward with an abutting surface cooperating with the inside edge of the lower front surface of the second inertia weight and which has on the other arm a supporting plate running perpendicular in relation to the axis of the fuze, which in a blocking position are located below the supporting fingers which project from the rear front surface of the first inertia weight and which release bores in the base of the fuze in their releasing position into which the supporting fingers submerge.

Further objects will be apparent from the following description when considered in connection with the accompanying drawings in which:

FIGURE 1 is a longitudinal section of a portion of the projectile taken on line A–B of FIG. 2 in the direction of the arrows and showing the safety mechanism in the safety position,

FIGURE 2 is a cross section taken on line A–B of FIG. 1 in the direction of the arrows,

FIGURE 3 is a longitudinal section of a portion of the projectile of FIGS. 1 and 2 taken on line C–D of FIG. 4 in the direction of the arrows and taken in a position of the projectile turned approximately 90° relative to FIG. 1 and showing the safety mechanism still in safety position,

FIGURE 4 is a cross section taken on line C–D of FIG. 3 in the direction of the arrows,

FIGURE 5 is a cross section similar to FIG. 1 with the parts in the same position but completely at nonsafety position and taken on line E–F of FIG. 6 in the direction of the arrows,

FIGURE 6 is a cross section taken on line E–F of FIG. 5 in the direction of the arrows, and

FIGURE 7 is a section of a detail taken on line G–H of FIG. 6 in the direction of the arrows.

The striker pin stem **15***b* is shown with the same reference character in U.S. Patent No. 3,124,074 and the cylindrical member **107** is mounted thereon. This latter has a spiral groove **107***a* in its periphery in which a lateral pin **108** projects which is secured in an intertia weight **109**. This latter is axially slidable on the mechanism carrier posts **105** and **106** and therefore is guided in a non-rotary manner and they carry in axial parallel relationship the safety finger **114** to provide a sure means to connect with the balance wheel regulator of the time mechanism.

Upon firing during the acceleration of the projectile, the intertia weight **109** will slide to the rear and since it is positively guided on the posts **105** and **106**, its lateral pin **108** by its projection in the spiral groove **107***a* will induce a rotation of the member **107**, which by means of the delay mechanism **110**, **111**, **112** and **113** will be braked. The return movement of the inertia weight **109** will operate against the supporting spring **119**.

The time safety mechanism is so adjusted that at the end of the definite time safety period of the inertia weight **109** with its back surface, the intermediate plate **102** has been reached. In his position the balance regulator will be freed by the forward end of the safety finger **114**.

To this mechanism from the U.S. Patent No. 3,124,074 there is now added the second inertia weight **209**. This latter is in the form of a surrounding cylinder around the inertia weight **109** and urged and movable by spring **210** in the chamber **211***a* of the fuze portion **211**. In its safety position it encloses partly the likewise cylindrical mechanism L on the supporting posts **105** and **106** over the fuze socket.

A pin bolt channel in the blocking plate **117** is on the fuze bottom plate **212** similar to U.S. Patent No. 3,124,-074 and having a plate group **102**, **103** and **104** mounted around the post **213** having a swing lever **214**, **214***a* and **214***b* mounted thereon which may swing radially outwardly. On its arms **214***a*, FIGURES 3, 6 and 7, these lever arms **214***a* are directed forwardly with head portions **214***a*[1] which are for the purpose of operating together with the inner edge **209***a* of the lower head surface of the inertia weight **209** in such a way that upon the return movement of the intertia weight **209**, FIGURES 3, 5 and 7, the intertia weight **209** will swing over the forward end slanting surfaces **214**[11] of the double lever **214** around its rotation pin **213**, FIGURE 6, in clockwise direction. By this swing movement the supporting plates **214***b*[1] which will be on the ends of the lever arms **214***b* out of the range of the support fingers **215** which will spring out from the back of the end surface or face of the first intertia weight **109** and will rest in the non-operative position, FIGURE 1, on the support plates **214***b*[1].

Thereby the blocking of the first inertia weight **109** will be accomplished and this can now operate under the continuing back pressure acceleration of its above described back movement by the drive of the spiral member **107** and thus the brake mechanism will operate whereby the support finger **215** will enter the bore **216** in the fuze base.

I claim:

**1**. Time-safety device for a time and percussion double fuze for projectiles with low acceleration, with and without twist, especially for rocket porjectiles comprising a fuze housing, a drive mechanism, a cylindrical body provided on its periphery with a helical groove, a pin bolt on which the body is rotatably mounted, an inertia weight connected to drive the body on the pin bolt, a cross bolt in the weight meshing with the helical groove, a timing mechanism having a balance regulator means to provide non-rotational linear movement of the inertia weight in the fuze housing, a second intertia weight mounted in the



fuze housing and which is movable in the same direction as the first-mentioned inertia weight and connected in series with the first-mentioned inertia weight, a disconnectable lock for the first-mentioned inertia weight so that at the end of its return path the disconnectable lock will block the first-mentioned inertia weight in its rearward position, a safety finger engaging the balance regulator and mounted on the first-mentioned inertia weight parallel to a longitudinal axis of the fuze to secure the balance regulator of the timing mechanism, and radially swingable double arm levers located on the bottom of a recess provided by said drive mechanism and having on one lever arm a bent portion directed forward with an abutting surface cooperating with the inside edge at the lower front surface of the second-mentioned inertia weight and on the other arm a supporting plate running perpendicularly in relation to the axis of the fuze which lever arms when in blocking position are located below supporting fingers provided on, and which project from, the rear front surface of the first-mentioned inertia weight and which lever arms release in their releasing position toward openings provided in the base of the fuze and into which the supporting fingers may submerge.

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T. H. WEBB, Assistant Examiner

U.S. Cl. X.R.

102—80, 83, 84