Jan. 11, 1955 R. LEROY 2,699,118

LOCKING ARRANGEMENT FOR THE ARMING MECHANISM OF THE FUSES OF PROJECTILES

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Fig. 1

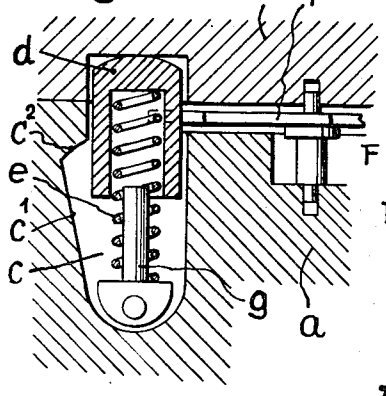


Fig. 3

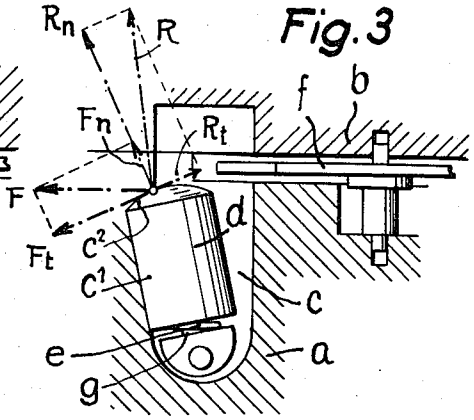


Fig. 2

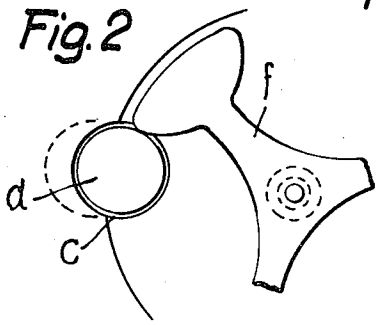


Fig. 4

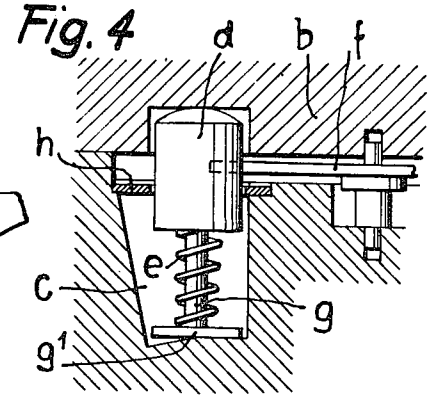


Fig. 6

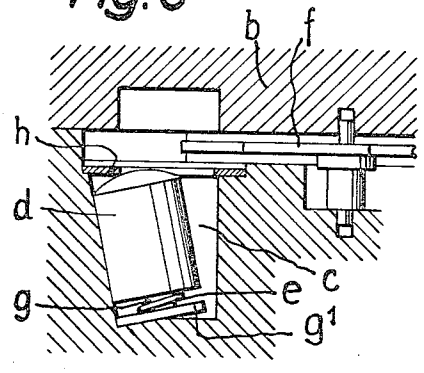
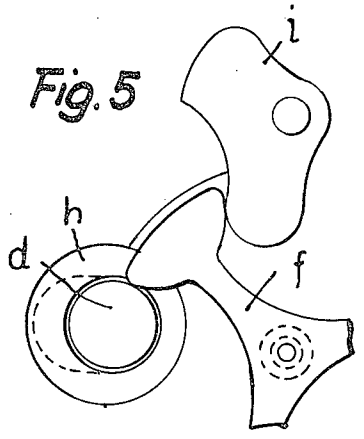


Fig. 5



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LOCKING ARRANGEMENT FOR THE ARMING MECHANISM OF THE FUSES OF PROJECTILES

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Claims priority, application Switzerland December 8, 1948

1 Claim. (Cl. 102—83)

The present invention relates to a bolting arrangement for the arming mechanism of the fuses of explosive shells and the like projectiles.

In accordance with the present invention, a bolt is carried inside a laterally enlarged recess provided in the fuse and is urged yieldingly, say through the agency of a return spring holding the bolt, into its locking position at one end of the recess in a manner such that at the starting of the projectile or shell said bolt may recede axially under the action of its inertia in antagonism with the action of the return spring and thereafter at the end of its stroke and under the action of centrifugal force may move laterally so as to engage the lateral enlargement of the recess and may remain held therein in its inoperative position as long as said centrifugal force is operative.

According to a preferred embodiment of the invention, the bolt moves longitudinally over a rocking member in antagonism with the return spring or the like means while the lateral movement is provided through the actual rocking of last mentioned member.

Appended drawings illustrate by way of example two manners of executing said invention. In said drawings:

Fig. 1 is a vertical cross-section through a locking arrangement illustrated in its locked or safety position, said arrangement corresponding to a first manner of executing the invention.

Fig. 2 is a view thereof from above.

Fig. 3 is an elevational view of the same arrangement illustrated in its released position.

Fig. 4 is an elevational view of an arrangement corresponding to a second manner of executing the invention and illustrated in its safety position.

Fig. 5 is a view of the arrangement according to Fig. 4.

Fig. 6 is an elevational view of the same arrangement when in its released position.

In the embodiment illustrated in Figs. 1 and 3, *a* designates the body, *b* the fuse cap for said body; said body is provided with a recess *c* extending upwardly into the fuse cap *b* so as to form a closed chamber in which is housed a hollow bolt *d*. Said bolt *d* is submitted to the action of a helical spring *e* urging said bolt upwardly so as to cause it to assume a position in which it locks a movable member *f* forming part of the arming mechanism, as more clearly apparent from inspection of Fig. 2; said bolt is yieldingly carried by a rocking member constituted by a bolt-guiding rod *g* provided with a base or support, pivotally carried in the lower end of the recess *c* so as to be capable of executing a rocking movement of small amplitude. The recess *c* is provided with a lateral enlarged portion *c*1 forming at its end further removed from the lower end of the recess a shoulder *c*2 against which the hollow bolt may bear in its receded and rocked position illustrated in Fig. 3.

The operation of said locking arrangement is as follows:

At the start of the projectile or discharge of the gun, the bolt *d* moves axially, under the action of its inertia and in antagonism with the action of the spring *e*, over its guiding rod *g* towards the base of the latter.

At the end of this axial movement, the receded bolt that is submitted to centrifugal force is urged laterally so as to execute a rocking movement together with its guiding rod *g* and to enter the lateral enlargement *c*1 of the recess *c*; it occupies then the position illustrated in Fig. 3 in which the bolt *d*, that is constantly subjected to the action of the spring *e*, is urged now against the shoulder *c*2; the movable member *f* and the corresponding

arming mechanism is consequently released and remains so as long as the bolt occupies, under the action of the centrifugal force, the position illustrated in Fig. 3.

The shape of the shoulder *c*2 and of the upper part of the bolt is defined in a manner such that the force R of the return spring *e* may be decomposed into a normal thrust R_n in its releasing position and into a tangential force R_t urging the bolt back in its original locking position.

The centrifugal force F is similarly decomposed into a normal bearing thrust F_n and into a tangential engaging force F_t urging the bolt into its release position. The two forces F_n and R_n lie in the same direction so as to operate additively whereas the tangential returning force R_t opposes the releasing force F_t so that the latter holds the safety bolt *c* reliably in its release position as soon as the projectile has left the gun muzzle and as long as the centrifugal force remains above a minimum value reached at the end of its trajectory, at which moment the centrifugal force sinks below said minimum value and the bolt is returned into its locking position. This is the case of a shell that has missed its target.

In the embodiment illustrated in Figs. 4, 5, 6, the rod *g* on which is slidingly mounted the bolt *d* is provided with a base plate *g*1. The bottom of the recess is defined by two planes forming an obtuse angle and the bolt and rod system may rock, under the conditions disclosed hereinabove round the line of intersection between said two bottom planes, as clearly apparent from inspection of Figs. 4 and 6 by reason of the engagement of the underside of the base plate with said line. In its releasing position, the bolt that is urged outwardly, on one hand, by the spring *e* and, on the other hand, by centrifugal force is held back by a retaining ring *h* as long as the centrifugal force remains operative.

Preferably, there is provided, in addition to the arrangements disclosed a pivotally mounted locking member *i* (Fig. 5) submitted to the action of centrifugal force so that the arming mechanism is locked between the bolt and the locking member *i*. The opening of the locking member producing a displacement of the arming mechanism with reference to the location of the bolt *d*, said displacement may be performed only when the bolt *d* is held in its releasing position through centrifugal force as illustrated in Figs. 3 and 6, whereby jolting in any direction can produce no undesired movement of the arming mechanism.

What I claim is:

In a shell fuse having an arming mechanism, a fuse body having a recess therein provided with a radially outwardly extending enlarged portion and a projection extending into the upper part of said enlarged portion, a fuse cap having a recess therein, said fuse cap recess being in alignment with said fuse body recess, a spring fitted bolt mounted for longitudinal movement in said recess and adapted to rock radially outwardly and remain in said enlarged portion under the action of a predetermined minimum centrifugal force developed by the rotation of the shell, the upper end of said bolt being rounded to engage said projecting shoulder such that when the centrifugal force falls below said predetermined value, said spring forces said bolt out of said enlarged portion into said fuse cap recess, a bolt guiding rod yieldably supporting said bolt and rockably mounted in the base of said fuse body recess, a movable member forming part of said arming mechanism, engaged by said bolt when said bolt is in said fuse cap recess, and pivotally mounted locking means to engage said movable member at a portion opposite the portion engaged by said bolt to restrict movement of said movable member away from said bolt and to hold said member engaged with said bolt.

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