

H. NORDENFELT.
SHELL FUSE WITH SAFETY DEVICE.
APPLICATION FILED APR. 9, 1912.

1,053,857.

Patented Feb. 18, 1913.

Fig. 1.

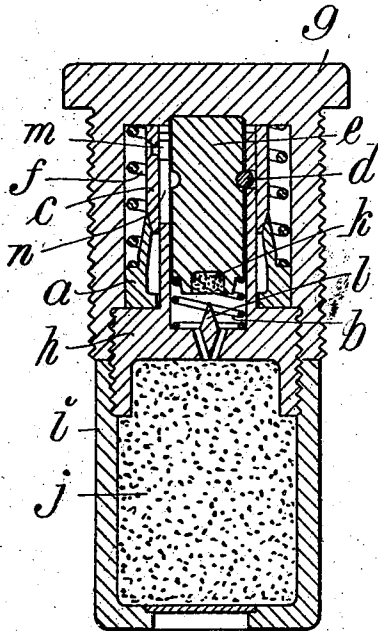


Fig. 2.

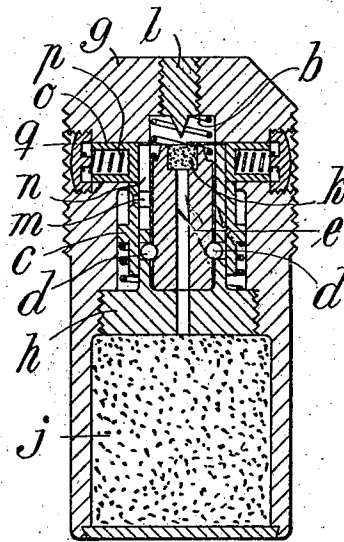


Fig. 3.

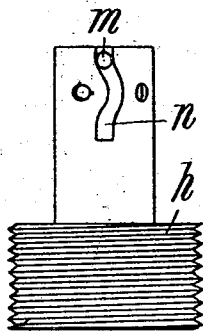


Fig. 4.

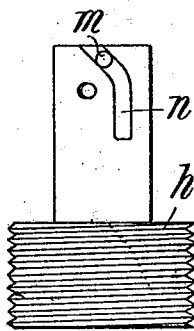
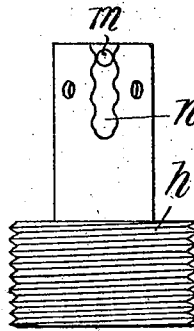


Fig. 5.



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SHELL-FUSE WITH SAFETY DEVICE.

1,053,857.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, HENRIK NORDENFELT, a subject of the King of Sweden, residing at Bofors, Sweden, have invented
5 new and useful Improvements in Shell-Fuses with Safety Devices, of which the following is a specification.

In fuses for high explosive shells it has always been desirable that the fuse shall remain
10 inoperative, *i. e.* that it shall not be possible to bring the charge to explosion, before the projectile has passed not only through the barrel but also to a certain distance in front of the mouth of the gun. For this
15 purpose, a longitudinally movable, simple or composite member has been used, said member being moved forward when the acceleration of the projectile ceases, either on account of its inertia or under the action of
20 a compressed spring or both, and making the fuse operative on impact so as to permit the explosion, only after moving through a certain distance. It has however been found, that in using such a safety device as well as
25 all those known heretofore which are based only upon mechanical principles the distance in front of the barrel mouth through which the projectile travels before being made operative only will amount to a few
30 meters, the safety for the service men of the gun thus being unsatisfactory.

The present invention has for its object to provide a device for surmounting the aforesaid inconvenience and consists in introducing a certain determined resistance
35 against the forward movement of the aforesaid longitudinally movable member, thus retarding the said movement and the moment in which the fuse becomes operative.
40 The invention is illustrated in the accompanying drawing where—

Figures 1 and 2 show two different forms of fuses embodying the same in a longitudinal section and Figs. 3-5 three different
45 forms of members characteristic to the invention.

In Fig. 1 which shows a base fuse the stationary fuse body consists of three parts
50 *g*, *h*, *l*, the last-mentioned of which embraces the charge *j*. The part *h* carries the igniting needle *i* and embraces partly by means of suitable recesses balls *d* which also engage recesses in the hammer *e* carrying the igniting cap *k*, the movement of said hammer
55 thus being prevented. The balls *d* are held

against moving out of the recesses in the hammer *e* by means of a surrounding ring or sleeve *c*. When the gun is fired, a sleeve *a* surrounding the sleeve *c* is moved backward on account of its inertia and compresses a
60 spring *f* which upon the ceasing of the acceleration again moves the sleeve *a* forward, the said sleeve having meanwhile been coupled to the sleeve *c* by means of a resilient flange so as to carry forth the latter when
65 moving forward. The balls *d* then are released and are thrown out by the centrifugal force, whereupon the fuse is operative, the hammer now being kept away from the igniting needle *i* only by the weak spring *b*.
70

As the forward movement of the parts *a* and *c*, as above stated, begins as soon as the acceleration of the projectile has ceased, or even somewhat before this moment, the operative condition of the fuse will be reached
75 too soon, if no special steps are taken to prevent this circumstance. According to the present invention, such steps are taken in that a resistance against the movement of the part *c* is introduced. A simple arrange-
80 ment for obtaining such a resistance is to cause a pin *m* secured to the part *c* to engage a slot *n* in the stationary fuse body *h*, or vice versa. The slot *n* may in some cases be straight and a sufficient resistance may still
85 be obtained on account of the pressure and friction between the pin and the side of the slot caused by the rotation of the projectile. In other cases, it may be found suitable to make the slot curved or its walls uneven for
90 obtaining the necessary increased resistance against the movement of the part *c*. Different examples of this principle are shown in Figs. 3-5. By an appropriate shape of the slot the entering of the operative state
95 of the fuse can be retarded at will.

Fig. 2 illustrates an application of the invention to a point fuse. Further, in this form only one longitudinally movable member *c* is present, said member moving back-
100 ward at the firing of the gun and compressing the spring *f* which after the ceasing of the acceleration moves the member *c* forward again. In this movement, the said member passes beyond its original position, because a
105 couple of locking members *o* situated in front of the same meanwhile have been removed by the centrifugal force against the action of springs *p* resting against nuts *q*. The retardation of the movement of the
110

member *c* is effected, as in Fig. 1, by a pin *m* engaging a slot *n* in the part *h* of the fuse, and the other parts of the fuse are also substantially identical to those of Fig. 1.

5 Obviously the resistance against the forward movement of the longitudinally movable member can be effected otherwise than by friction against the stationary parts of the fuse, as for instance by the inertia of
10 some member. Also it is obvious that for effecting the friction other devices may be used than pins engaging slots.

Having now particularly described the nature of my invention and the manner of its
15 operation, what I claim is:

1. In safety devices for shell fuses, a hammer, a firing pin, locking members for normally preventing contact between said hammer and firing pin, a longitudinally movable

member for releasing said locking members, 20 and a pin on said longitudinally movable member engaging a slot in a stationary part of the fuse.

2. In safety devices for shell fuses, a hammer, a firing pin, locking members for normally preventing contact between said hammer and firing pin, a longitudinally movable member for releasing said locking members, 25 and a pin on said longitudinally movable member engaging a curved slot in a stationary part of the fuse. 30

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HENRIK NORDENFELT.

Witnesses:

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EMIL OLSSON.