

May 13, 1930.

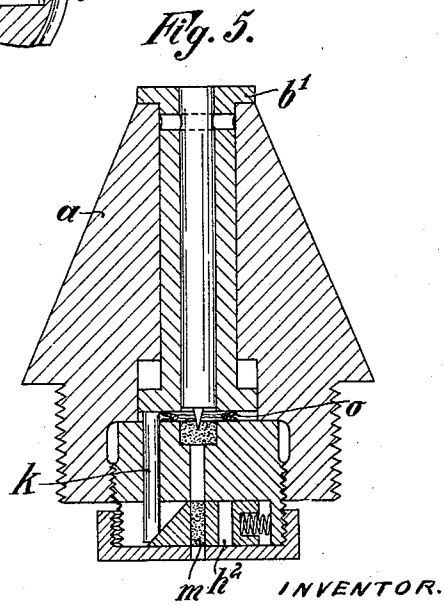
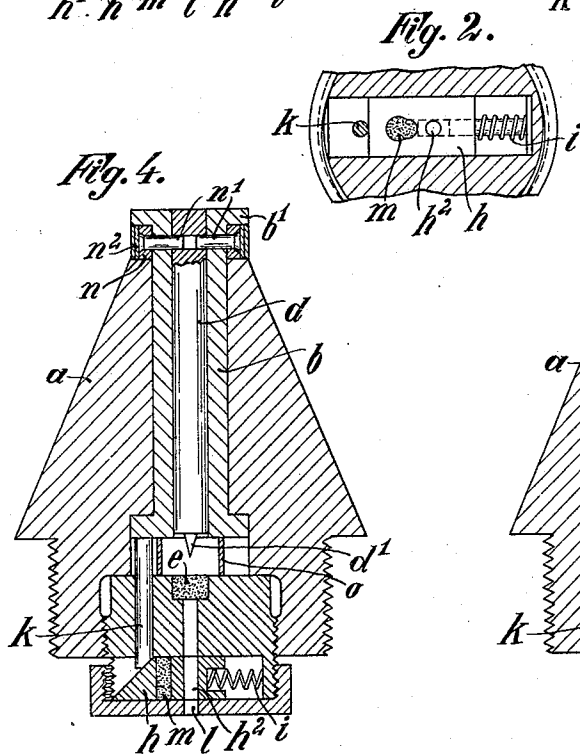
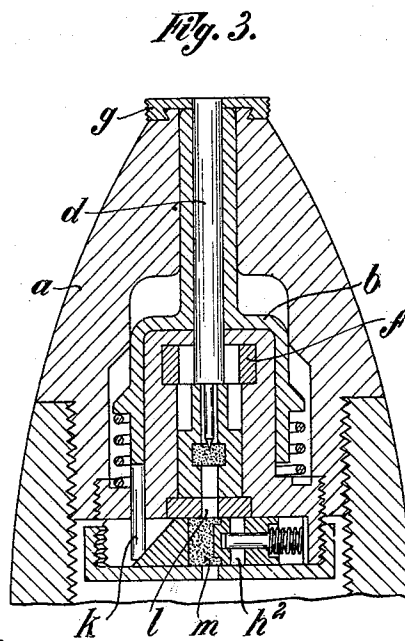
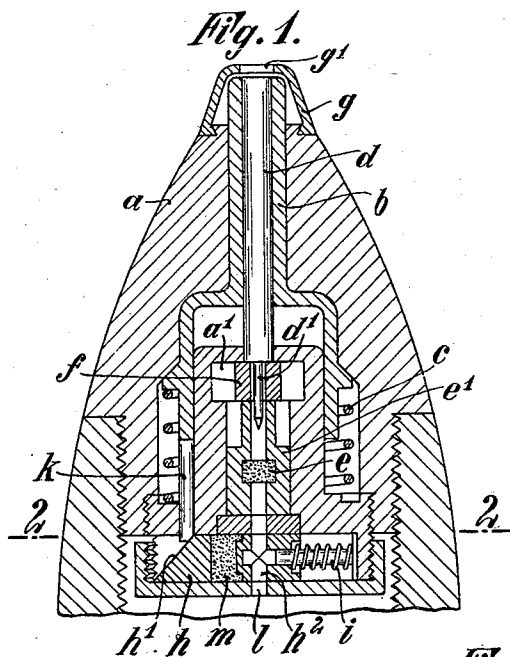
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1,758,635

HIGHLY SENSITIVE HEAD IMPACT FUSE

Filed Dec. 31, 1928

2 Sheets-Sheet 1



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Fig. 6.

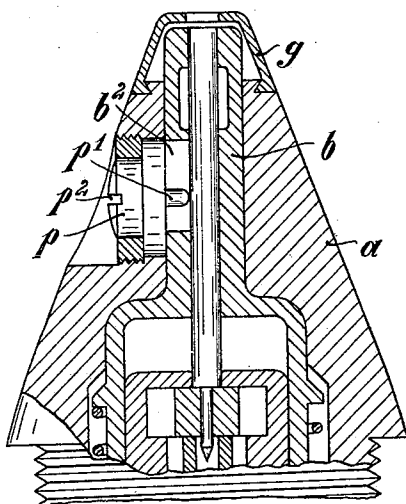


Fig. 7.

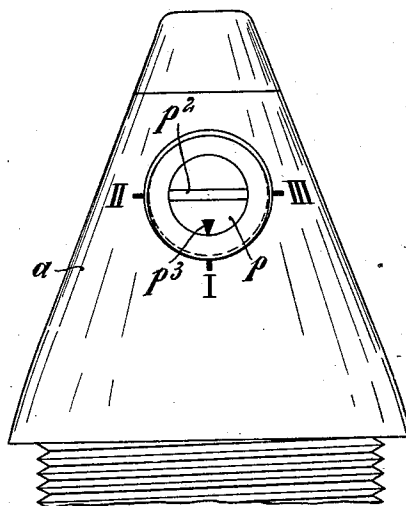


Fig. 8.

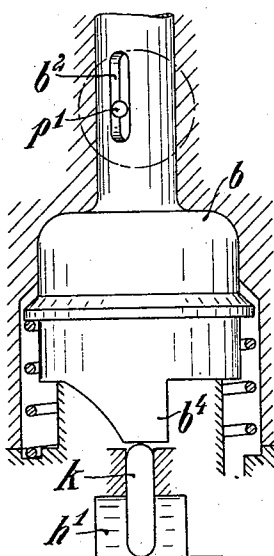


Fig. 9.

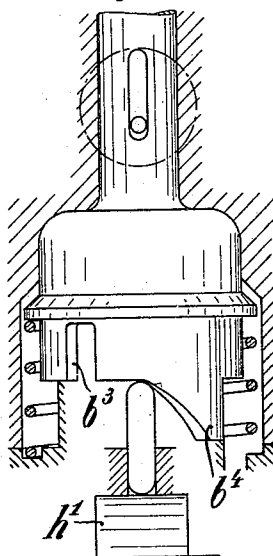
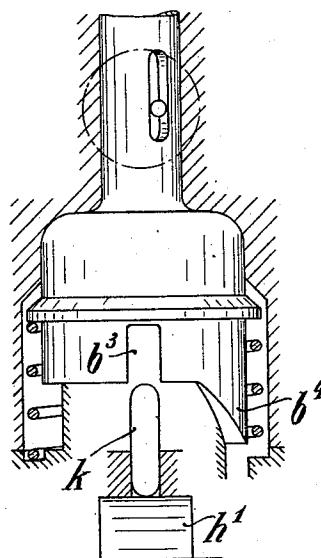


Fig. 10.



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UNITED STATES PATENT OFFICE

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HIGHLY-SENSITIVE HEAD-IMPACT FUSE

Application filed December 31, 1928, Serial No. 329,408, and in Germany January 2, 1928.

The invention concerns a highly sensitive head impact fuse with striker pin lying free at the percussion point. The new feature in the fuse is, that in addition to the known fuse (igniting) device which acts at the moment of the impact it has a device whereby on striking against brickwork or armour plating automatically it acts with retardation. The arrangement is further provided by which the fuse can, before firing off, also be set by hand to either of these modes of action.

On the drawing three constructional examples of the invention are shown, Fig. 1 showing a longitudinal section through a fuse, Fig. 2 a section along 2—2 of Fig. 1, and Fig. 3 an illustration corresponding to Fig. 1 with a different position of the parts. Fig. 4 a longitudinal section through another constructional form of the fuse, Fig. 5 the same fuse with another position of the parts, Fig. 6 a fuse according to Fig. 1 with a special device, Fig. 7 the corresponding lateral elevation, and Figs. 8 to 10 a part of the arrangement of the fuse according to Figs. 6 and 7 with different position of the parts.

In the fuse body *a*, a sleeve *b* is mounted so as to be axially slidable against the pressure of a spring *c*. In the sleeve or bush *b*, there is a striker pin *d*, which lies freely at the tip of the projectile, and the other end of which carries the percussion point *d'*. In front of the percussion point *d'* there lies the primer *e*. The primer carrier *e'* is mounted slidably in the fuse body. In a hollow chamber *e'* of the fuse body a centrifugal guard *f* of known design is placed which in the position of rest keeps the percussion point *d'* away from the primer *e*. The tip or nose of the fuse is formed by a cap *g* which is of softer material than the fuse body, for example of brass. The cap has in the centre a hole *g'*. In the bottom part of the fuse a slide is mounted slidable transversely to the fuse axis which slide is under the compression of a spring *i* and has a sloping surface *h'*. On this sloping surface there rests, being slidably mounted in the fuse body, a pin *k* the upper end of which rests against the sleeve *b*. The slide *h* is provided with a bore *h'* which in the position of the parts illustrated in Fig. 1 lies in the path of the fuse bore *l*. A second bore in the slide is also filled with a retarding compound *m*.

In the constructional form according to Figs. 4 and 5 the spring *c* of the sleeve *b* is dispensed with. The sleeve *b* is, in this case, provided on its end which projects out of the fuse body with a collar *b'*, the sleeve *b* and the striker pin *d* are bored transversely and in the bore they receive two pins *n'* mounted on locking pieces shaped like half circles. The locking pieces *n* are surrounded by a packing *n'* consisting of a strip of brass or the like having a weight welded thereon. At its bottom end the sleeve *b* rests against the fuse body with a thin ring *o* interposed.

In Figs. 6 to 10 a fuse of the same design as the fuse according to Figs. 1 to 3 is shown having a bolt *p* directed transversely to the axis of the fuse, which bolt is rotarily mounted and projects by means of an excentric pin *p'* into a slit *p''* of the sleeve *b*. For the purpose of effecting a rotation a suitable tool can be introduced into a slit *p''* provided in the head of the bolt *p*. At the edge of the recess in the fuse body which receives the bolt *p* three marks I, II and III are provided to which a mark *p'* of the bolt can be set on rotating it. The bottom edge of the sleeve *b* (Figs. 8 to 10) has a cut away part *b'* and a cam *b''*; each of these can on suitable adjustment of the sleeve *b* come into engagement with the bolt *k*.

The way in which the fuse acts is as follows: In the position of rest the parts of the fuse assume the position shown in Fig. 1 in which the centrifugal guard *f* keeps the percussion point *d'* away from the primer *e*. The projectile is inserted with the fuse, without preparation in the barrel of the gun and

fired off; on striking against an object the fuse automatically acts according to the nature of the target either instantaneously or, on striking against armour plate or brickwork, with retarded ignition. On firing off, the sleeve *b*, by its inertia, slips back into the body of the fuse, whereby the spring *c* is put under tension and bolt *k* is pressed downwards so that the slide *h* moves to the right. As in this process the retardation charge *m* gets into the fuse bore *l* then if the primer *e* was ignited at the same time the shot, nevertheless, cannot burst in the barrel but only after leaving the barrel.

Normally however the centrifugal guard *f* only comes into operation after leaving the barrel; although from that moment onwards it leaves the percussion point and the primer free the latter nevertheless can not yet be ignited because meantime the acceleration of the projectile has ceased.

On impact of the shot on a soft target, something of the substance of the target (e. g. earth) penetrates through the hole *g*¹ and forces the bolt *d* back so that the percussion point *d*¹ mounted thereon ignites the primer *e*. The cap *g* at that time holds the sleeve *b* secure against displacement so that the ignition which has taken place is immediately transmitted through the open fuse bore *l* to the charge of the shot.

If the shot ricochets (without coming into contact by its nose) then it undergoes a retardation during which the primer carrier *e*¹ is shot forward by its own inertia so that the primer *e* is ignited by the percussion point *d*¹. In this case too, the ignition takes place without retardation because the fuse bore *l* is open for the passage of the ignition jet.

If the shot strikes against a hard target (armour plating, brickwork, etc.) the softer cap *g* is forced in and thus the bolt *d* and the sleeve *b* shifted out of their position as in Fig. 1 into the position as in Fig. 3. The bolt *k* also shares in this motion shifting the slide *h* to the right so that now the retardation compound *m* is inserted in the fuse bore *l*; the ignition jet of the primer *e* meantime ignited, therefore ignites the charge with retardation.

In the constructional example according to Figs. 4 and 5 the striker guard consists of two half rings *n* with pins *n*¹ mounted thereon, by which the tube *b* and the bolt *d* are coupled with each other. On firing when the shot has passed out of the barrel the band 2 unwinds by the action of centrifugal force and for the same reason, moreover the half rings *n* fall off, so that the fuse is now ready for immediate ignition. For the rest, the fuse works in the same way as the first described with the difference that here the cap *g* is replaced by a ring *o* which on impinging on a hard target is compressed by the receding sleeve *b* (Fig. 5). The fuse can also be provided with a

device whereby before being fired it can be set by hand as desired to instantaneous ignition, retardation or automatic action. As a rule the adjusting mark *p*³ of the device is in the position marked I in Fig. 7. In this position the fuse acts in the manner above described with automatic regulation of the mode of ignition; the relative position of the parts for this position I of the mark is illustrated in Fig. 9. If on the contrary the mark *p*³ is turned into the position marked II then the cam *b*⁴ comes to lie above the bolt *k* (see Fig. 8) which it presses down, so that the slide *h* is forced back and retardation compound *m* gets into the fuse bore *l*; the fuse must therefore on any impact act with retardation. If the bolt *p* is turned so that the mark *p*³ gets into the position III then the parts assume their position shown in Fig. 10 in which the cut away part *b*³ of the sleeve *b* is below the bolt *k*. Depression of the sleeve *b* therefore has no effect on the bolt *k* or the slide *h*, so that the fuse must on any impact act by instantaneous ignition.

I claim:

1. In a highly sensitive head impact fuse with striking pin lying freely at the percussion point, in combination, a sleeve surrounding the striking pin, automatic means for inserting a retardation compound in the fuse bore on sliding of the sleeve and means for holding the sleeve in a position of rest on impinging on other than resistant targets.

2. In a highly sensitive head impact fuse with striking pin lying freely at the percussion point in combination, a slidable sleeve surrounding the pin and automatic means for inserting a retardation compound in the fuse bore, consisting of a slide carrying the retardation compound which slide has a sloping surface on the upper part of which the sleeve rests in its position of rest.

3. In a highly sensitive head impact fuse with striking pin lying freely at the percussion point in combination, a slidable sleeve surrounding the pin and automatic means for inserting the retardation compound in the fuse bore consisting of the slide carrying the retardation compound which slide is held by a spring in the position in which the fuse bore is clear.

4. In a highly sensitive head impact fuse with striking pin lying freely at the percussion point, in combination, a slidable sleeve surrounding the pin, means for automatic insertion of a retardation compound in the fuse bore on sliding of the sleeve and means for setting the fuse by hand to instantaneous or retarded ignition, consisting of cut away parts provided on the sleeve and a cam, both of which can enter into the engagement with the carrier of the retardation compound, and a device for rotating the sleeve into three different positions.

5. In a highly sensitive head impact fuse

with striker pin lying freely at the percussion point, in combination, a sleeve surrounding the striking pin, automatic means for inserting a retardation compound in the fuse bore on sliding of the sleeve and means for
5 holding the sleeve in a position of rest on impinging on other than resisting targets, consisting of a cap or the like of softer material than the fuse body, fixed above the sleeve,
10 or a ring arranged beyond the sleeve and supporting it against the fuse body.

In witness whereof I have hereunto set my hand.

HANS WIESER.

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