June 3, 1924. 1,496,271

O. JUNGHANS

PERCUSSIOM FUSE

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Fig.2.

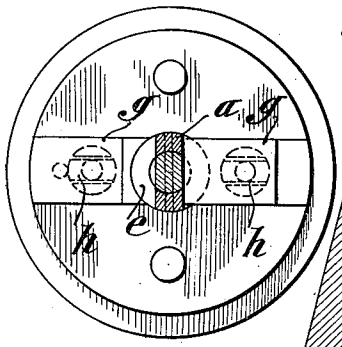


Fig.3.

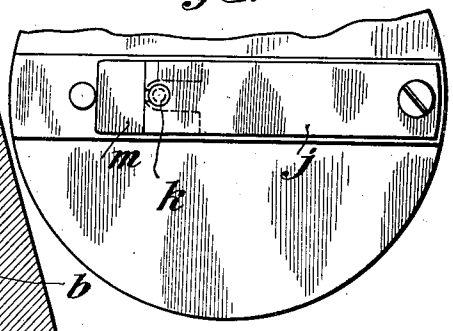


Fig.1.

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Fig.4.

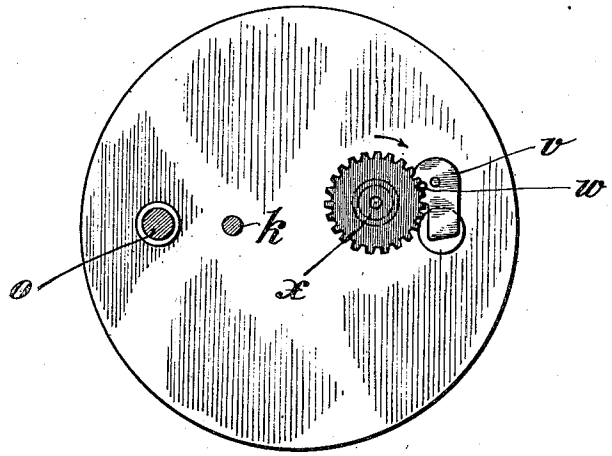
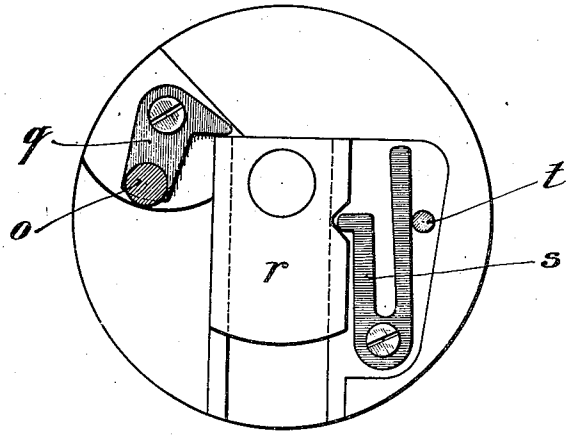


Fig.5.



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UNITED STATES PATENT OFFICE.

OSKAR JUNGHANS, OF SCHRAMBERG, GERMANY.

PERCUSSION FUSE.

Application filed June 22, 1923. Serial No. 647,062.

To all whom it may concern:

Be it known that I, OSKAR JUNGHANS, a citizen of the German Republic, residing at Schramberg, Germany, have invented certain new and useful Improvements in Percussion Fuses, of which the following is a specification.

My invention relates to a percussion fuse and in particular to a fuse of the type having a movable member, such as a pin or the like, mounted in the top portion of the fuse to project therefrom outwardly, and adapted to initiate explosion by being moved inwards on a mere contact with the target, soil and the like.

In fuses of the stated kind the projecting impact pin or the like is a source of permanent danger during transport and storage and for this reason it has been suggested heretofore to remedy this defect by providing a separate projecting member which is not applied to and inserted into the fuse except at the time of loading the gun or ordnance. It has been found in military practice, however, that a bipartite fuse of the kind is not convenient for several reasons.

The object of my invention is to provide a percussion fuse of the stated type in which the movable impact member is entirely housed within the fuse body so as not to project therefrom, the construction of the fuse being such that the said member, upon firing, will be moved automatically from its inoperative or concealed position into the operative or projecting position.

An embodiment of my invention is illustrated in the annexed drawings, in which:—

Figure 1 is a longitudinal axial section of the fuse;

Figure 2 is a sectional view taken on the line 2—2 of Figure 1;

Figure 3 is a partial sectional view taken on the line 3—3 of Figure 1; and

Figures 4 and 5 are sections on lines 4—4 and 5—5, of Figure 1.

The top portion of the body of the fuse has an axial bore in which the movable impact member, such as a pin *a*, is encased so as to be movable therein lengthwise. The said pin *a* is provided with a collar *b* adapted to co-operate with an inner annular flange or rib b^1 at or near the outer end of the bore, when the pin *a* assumes its foremost position upon firing, the said flange or rib and the collar thus acting to determine the extent or length to which the pin will project beyond the top face of the fuse after firing. A spring *c* is coiled about the lower end of the pin so as to engage with its upper end the said collar and engage with its lower end against a suitable abutting surface.

The lower end of the pin *a* which is encircled by the spring *c*, is provided with an axial extension *d* of a smaller diameter than that of the main body of the pin. Said extension *d* is split and shaped to form a kind of spring fork, a casing or bushing *e* being provided in which the said split portion is normally received. The bushing *e* is mounted to be likewise displaceable lengthwise against the action of a spring *f* coiled thereabout. Intermediate the ends of the extension *d* two lateral recesses are provided, Figures 1 and 2, in which two slides *g* are adapted to engage, when the pin is forced into the interior of the fuse against the action of the hereinbefore mentioned spring *c*, Figure 1. The two slides *g* are mounted to be subject to centrifugal force, but normally they are retained in known manner in locking position, as shown, by means of so-called pins *h*, so that any accidental unlocking of the pin *a* will be duly prevented.

The casing or bushing *e* is located above a vertical auxiliary pin *i* so that all the parts such as the pin *a*, its extension *d* including the springy lower end thereof, the bushing *e* and the pin *i* are in axial alignment. The pin *i* is movable axially and properly guided for such movement. Normally the pin *i* is seated with its lower end on the spring *j* of the firing pin *k*. The latter is locked in its uppermost or inoperative position by means of a block *m*, so that it cannot move downwards (in the drawing). The block *m* is mounted to be subject to centrifugal force, but is normally held against outward movement due to such force by means of a vertical bolt *o*, the upper end of which is disposed in the path of the block; said bolt being pressed downward by an encircling coil spring *n* and resting at its lower end on a lever *q* (Figure 5) which is likewise operated by centrifugal force but is normally locked against operation by a slide *r*. This slide, which carries in known manner a charge of picrate, is retained in the position illustrated in Figure 5 by the catch member of a centrifugally-operated lever *s*, which is itself engaged and locked by bolt *t*, and in such position, said slide cuts out communication be-

tween the percussion cap *z* and the igniting charge in the lower part of the fuse body. The bolt *t* just referred to is subjected to the upward pressure of a coil spring *u*, but is held against movement, prior to firing, by a centrifugally-operated lever *v* (Figures 1 and 4) which normally projects across its upper end, as shown; said lever *v* carrying a pin or tooth *w* which is engaged in the adjacent tooth-space of the driving wheel or gear *x* of the firing clockwork (Figure 4), so that the outward swinging movement of the lever is prevented as long as the clockwork is motionless. The opening in the top of the fuse body is closed by means of a lead-stopper or the like, in the usual way, but prior to the insertion of the projectile in the gun or ordnance the stopper is to be removed from the fuse.

The action of the mechanism is as follows:—

On firing, the pins *h* move backwards owing to their weight, so that the slides *g* will be unlocked and free to move towards the periphery of the fuse, due to centrifugal action, into the position shown on the left-hand side of Figure 1, whereupon the pin *a* will be forced out by the action of its spring *c*. This movement of the pin *a*, however, is limited by the collar *b* contacting with the rib or flange b^1. At the same time the extension *d* of the pin will be withdrawn from the bushing *e*, but only so far that the divided, springy end thereof will remain within the recessed or shouldered mouth *p* of the bushing and assume a spread or expanded position therein due to its springy nature. The clockwork, which is likewise set in motion by the firing, rotates the wheel *x* in the direction of the arrow (Figure 4), thereby rocking lever *v*, due to its engagement with tooth *w*, far enough to release the same, with the result that said lever is thus free to continue its movement under the action of centrifugal force. The end of the lever is thus released from bolt *t*, which thereupon moves upward under the influence of spring *u* and, in turn, releases lever *s*. The latter then swings outward automatically, due to centrifugal force, and disengages slide *r* which is likewise operated by centrifugal force, moving endwise in an outward direction. This frees lever *q*, which turns counter-clockwise around its point, withdrawing its supporting arm from beneath bolt *o*; said bolt being then moved downward by spring *n* and releasing block *m*, and the latter, in turn, moving outward and releasing the spring *j* of the firing pin *k*. Upon impact, the striker pin *a* will be forced inwards and the bushing and the inner pin *i* will be moved inwards by the thrust received from the pin *a*. As this inward movement is transmitted directly to the spring *j* connected with the firing pin *k* so that the latter will be forced backwards towards the percussion cap or primer *z* and explosion is effected in the usual manner.

From the foregoing description it will be seen that simple and efficient means are herein provided for accomplishing the object of my invention, but while the means or elements shown and described are well adapted to serve the purposes for which they are intended, I wish it to be understood that my invention is not limited to the precise construction, arrangement and shape of the details shown and set forth, but includes within its purview such changes as may be made within the scope of the appended claims.

What I claim is:—

1. In a percussion fuse for shells, the combination, with the fuse body, firing mechanism therein including a firing pin, and a striker slidably mounted in the nose of the body: of a bushing interposed between the striker and the firing pin, and adapted to actuate the latter and an inwardly-extending stem on the striker having a constant sliding fit in the bushing; said striker and bushing having coacting means for automatically and positively coupling them together when the shell is fired, thereby to cause them to move inward as a unit to enable the actuation of the firing pin by said bushing when the striker is forced inward on hitting an object.

2. In a percussion fuse for shells, the combination, with the fuse body, firing mechanism therein including a firing pin, and a striker slidably mounted in the nose of the body: of a bushing interposed between the striker and the firing pin, and adapted to actuate the latter, an inwardly-extending stem on the striker having a constant sliding fit in the bushing, means for normally holding the striker and its stem in retracted position, said means being releasable automatically when the shell is fired, means for projecting said striker and stem outward when such release is effected, and coacting means on the stem and bushing for automatically and positively coupling them together at the conclusion of the outward movement of the striker whereby said stem and bushing will be caused to move inward as a unit to the actuation of the firing pin by said bushing when the striker is forced inward on hitting an object.

3. In a percussion fuse for shells, the combination, with the fuse body, and firing mechanism therein including a firing pin: of a striker normally concealed in the fuse body and having an inwardly-extending stem; a spring tending to project the striker outward; means for locking the striker in concealed position, said means being releasable automatically when the shell is fired; a bushing interposed between the firing pin

and the striker and wherein the striker stem has a constant sliding fit, said bushing adapted to actuate the firing pin; and coacting devices on the striker stem and bushing for automatically coupling them together at the conclusion of the outward movement of the striker, so as to cause them to thereafter move inwardly as a unit to enable the actuation of the firing pin by said bushing when the striker hits an object.

4. A percussion fuse according to claim 3, in which the coacting coupling devices comprise an annular shoulder at the outer end of the bore of the bushing, and an expansible spring fork on the inner end of the striker stem adapted to snap into engagement with said shoulder when the striker completes its outward movement.

5. In a percussion fuse for shells, the combination, with the fuse body, firing mechanism therein including a firing pin, and a striker slidably mounted in the nose of the body: of a bushing having an annular shoulder at the outer end of its bore, and an axial extension on the striker slidably fitting in said bore and having an expansible fork at its inner end which is adapted to automatically snap into engagement with said shoulder when the shell is fired, thereby to couple the striker and bushing together for inward movement as a unit to actuate the firing pin when the striker hits an object.

6. In a percussion fuse for shells, the combination, with the fuse body, firing mechanism therein including a firing pin and a movable carrier for the same, and a striker slidably mounted in the nose of the body: of a bushing having an annular shoulder at the outer end of its bore, a pin disposed in line with the bushing and contacting at opposite ends with the firing pin carrier and the inner end of said bushing, and an axial extension on the striker slidably fitting in said bore and having an expansible spring fork at its inner end which is adapted to automatically snap into engagement with said shoulder when the shell is fired, thereby to couple the striker and bushing together for inward movement as a unit when the striker hits an object and to transmit such movement to the second-named pin and thence to the carrier for the firing pin to actuate the latter.

In testimony whereof I affix my signature.

OSKAR JUNGHANS.