

July 31, 1945.

H. JUNGHANS

2,380,764

FUSE

Filed April 7, 1941

2 Sheets-Sheet 1

Fig. 1.

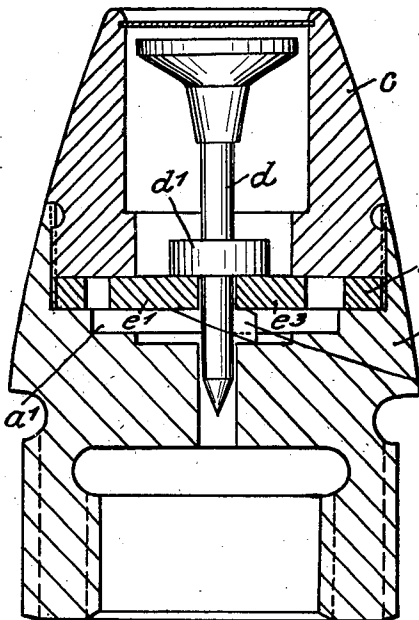


Fig. 2.

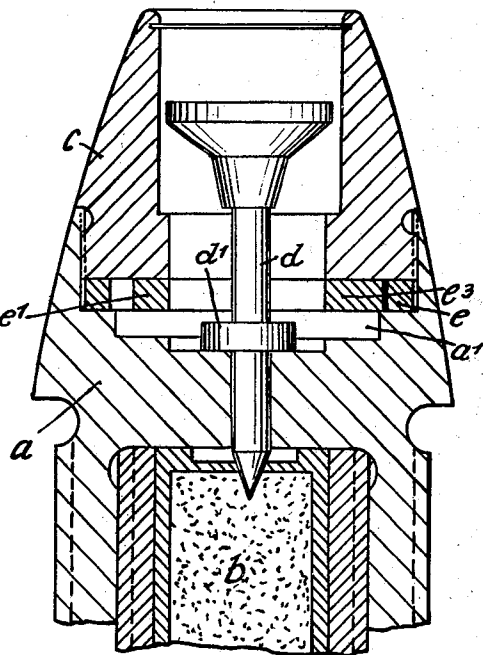


Fig. 3.

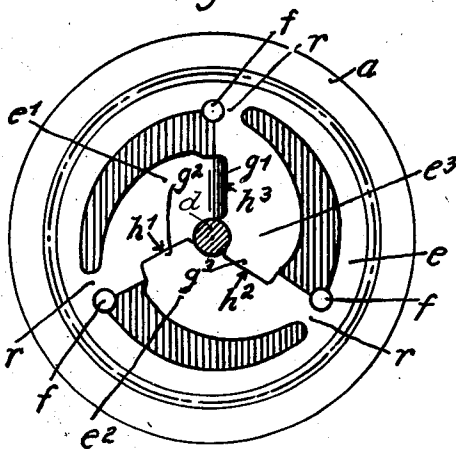
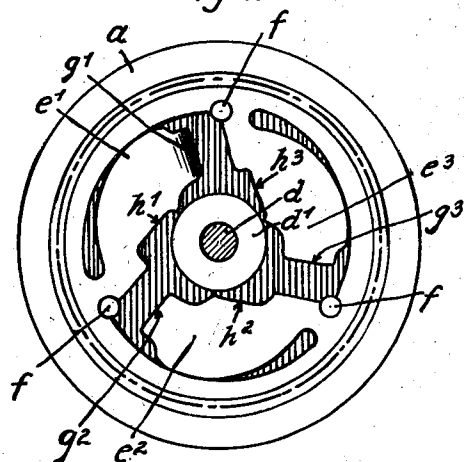


Fig. 4.



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Fig. 5.

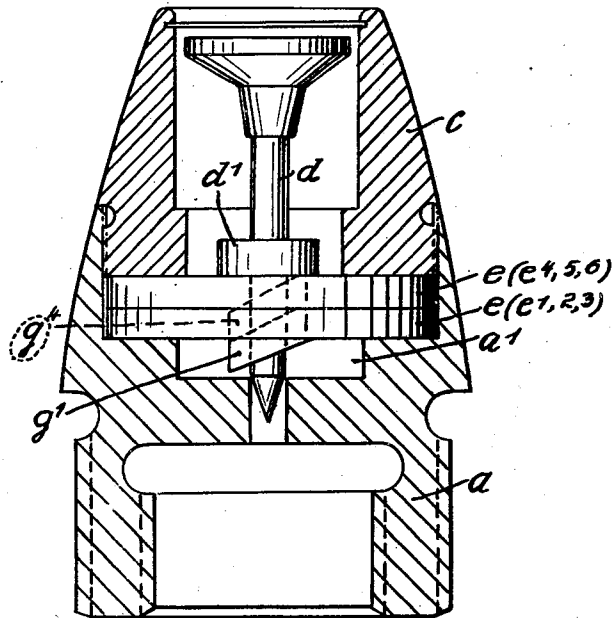
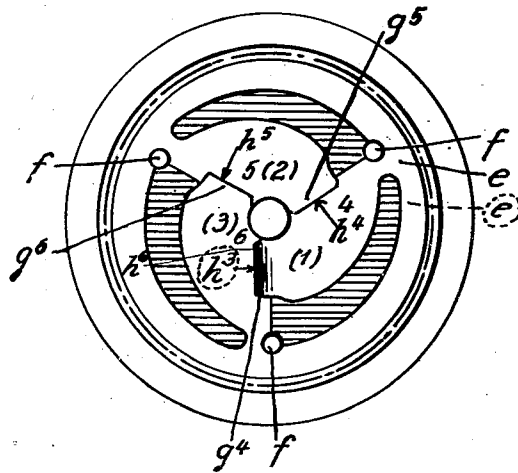


Fig. 6.



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UNITED STATES PATENT OFFICE

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FUSE

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Germany; vested in the Alien Property Custodian

Application April 7, 1941, Serial No. 387,324
In Germany April 29, 1937

2 Claims. (Cl. 102—79)

The invention relates to a time safety device for direct action percussion, provided with several centrifugal jaws adapted to release themselves one after the other and two of which at least are arranged in a common plane. Each centrifugal jaw is provided with a nose and a recess.

It is one of the objects of the present invention to provide a time safety device for direct action percussion fuses, which is capable of obtaining a longer safety. And which is simple in its construction and easy to manufacture. This result is obtained according to the present invention by augmenting the number of the centrifugal jaws without interfering with the gauge of the projectile.

A further object of the invention is the provision of a time safety device adapted to be used for the smallest gauges of projectiles e. g. between 1 and 2 cm.

The several jaws are arranged to move successively, the first jaw moving when it is subjected to a predetermined centrifugal force due to the rotation of the shell. The second jaw to be moved is held against movement by a locking connection between the first and second jaws which connection is released on movement of the first jaw, as will be more fully described hereafter. Similarly the third and fourth jaws are released for movement, only on movement of the preceding jaw.

Not only two, but any number of sets may be arranged one above the other. It is understood that all jaws will swing out one after the other.

According to an other feature of the present invention the centrifugal jaws of the time safety device are constructed in such a manner that they receive a lasting or permanent change of their form or shape, if the said jaws clash outwards so that the centrifugal jaws remain in their release position.

The centrifugal jaws of each set are comprehended in a unitary safety-member or "safety-element" by a common carrier connecting the roots of the said jaws. In order to provide a time safety device with a predetermined delay-action a suitable number of these unitary safety-members are arranged one above the other, the nose of each centrifugal jaw being in engagement with a recess of the following one and the nose of the first centrifugal jaw of each set being arranged with respect to the sequence of swinging movements of the several centrifugal jaws always on the same side of the said set of jaws. The manufacturing of these safety-members may be

effected in a simple and convenient manner by a punching or stamping operation, whereat the centrifugal jaws are in their closed position.

To these ends the invention consists of the parts and combinations of parts, as hereinafter described, and more particularly pointed out in the claims at the end of this specification.

A constructional form of the invention is shown by way of example in the accompanying drawings, wherein

Fig. 1 is a longitudinal section through a direct action percussion fuse according to the present invention in which three centrifugal jaws are adapted to lock the firing pin.

Fig. 2 is a longitudinal section through a percussion fuse, in which the centrifugal jaws set free the firing pin, and

Figs. 3 and 4 are top plan views of the percussion fuses shown in Figs. 1 and 2, in which the fuse cap is removed, Fig. 3 showing the jaw in unmoved or firing pin locking position, and Fig. 4 showing the jaws in moved or pin releasing position.

Fig. 5 is a longitudinal section through a percussion fuse having two superimposed safety members, in which the fuse cap is removed and in which the centrifugal jaws are in their locking position, and

Fig. 6 is a plan view thereto.

The direct action percussion fuse according to the present invention comprises as shown in the drawings a fuse body *a* provided with the priming cap *b* and a fuse cap *c*. As a sensitive direct action percussion fuse it contains a plunger or firing pin *d* provided with a collar *d'*. Between the fuse cap *c* and the fuse body *a* there is arranged a safety member which may be framed between the said parts. In the embodiment shown in the drawings additional pins *f* are provided for preventing a rotation or turning movement of the said safety member. According to the present invention the safety member is constructed in the form of a disk-shaped part having an annular support *e* and a series of centrifugal jaws *e*¹, *e*² and *e*³, the roots of which are connected to the said annular support *e* by narrow necks *r*. The material from which the safety member may be made is chosen in such a manner and so treated that at a predetermined rotation of the projectile or shell the centrifugal jaws clash outwardly about their roots and receive thereby a lasting or permanent change of their form or shape so that they remain in their release position as shown in Figs. 2 and 4 of the drawings.

The centrifugal jaws are provided with locking noses g^1, g^2, g^3 and recesses h^1, h^2, h^3 respectively. However, the locking nose g^1 of the centrifugal jaw e^1 does not enter into the recess h^3 of the centrifugal jaw e^3 , but lies for the thickness of the safety disk in a lower plane in such a manner that the said centrifugal jaw is in the position to swing out without hindrance. On the contrary the nose g^2 of the centrifugal jaw e^2 is in engagement with the recess h^1 of the first centrifugal jaw e^1 and the nose g^3 of the jaw e^3 is in engagement with the recess h^2 on the centrifugal jaw e^2 . As soon in the operation as centrifugal force is effective the centrifugal jaw e^1 swings out first and releases after that the centrifugal jaw e^2 , whereupon the said jaw e^2 releases the centrifugal jaw e^3 .

It can be understood from the above description taken in connection with the accompanying drawings that in a safety device having three centrifugal jaws the locking nose g^1 of the first centrifugal jaw e^1 does not come into action. It is, however, not suitable to remove or omit the said locking nose for the reason that the safety member should be used without any variation in all safeguards or safety devices of the type in question. Preferably there is made room for the nose g^1 of the centrifugal jaw e^1 by providing a groove or recess a^1 in the fuse body a as shown in Fig. 1 of the drawings.

In the modification shown in Figs. 5 and 6 of the drawings two safety members are arranged one above the other and both safety members are completely equal in their construction. As shown in the drawings the locking nose g^4 of the upper safety member projects downwards into the plane of the lower safety member and enters into the recess h^3 of the centrifugal jaw e^3 .

The operation of the time safety device comprising two safety members arranged one above the other is as follows:

First of all the centrifugal jaw e^1 of the lower safety disk swings outwardly and releases thereby the centrifugal jaw e^2 which thereupon releases the centrifugal jaw e^3 . As the said jaw e^3 is in locking engagement with the centrifugal jaw e^2 swinging outwards first in this plane, the unlocking movement is transferred by means of the said jaw e^3 into the next higher plane so that the said centrifugal jaw e^2 is in a position to swing outwards and thereupon the centrifugal jaws e^2 and e^4 .

It is apparent from the above description that any number of the superimposed safety members may be employed according to the desired safety time and, of course, according to the ability of the centrifugal jaws operating with a permanent change of form and releasing themselves

one after the other. In any case the safety device according to the present invention is useful as so-called "mask-safety" and may be used for small calibre shells with percussion type fuses.

The safety members of the time safety device according to the present invention may be made by a punching or stamping operation. In this operation the experience has proved that it is possible to punch or stamp the centrifugal jaws in their closed position and simultaneously to bend downwards the locking nose of the first centrifugal jaw and all this in a single working operation.

The uniting or combination of at least two centrifugal jaws to a safety member is the best possible method from the view of manufacturing for the realization of the present invention. It is, however, also possible to manufacture or produce the centrifugal jaws as separate pieces and to insert them into the fuse without departing from the scope of the present invention. In this case it may be also possible to arrange the said separate centrifugal jaw in different planes.

I am aware that numerous changes may be made in the construction of my time safety device and that certain features of my device may be applied to different classes of constructions from that herein shown and described. I do not wish, therefore, to be limited to the construction herein shown and described.

What I do claim, and desire to secure by Letters Patent of the United States, is:

1. In a percussion fuse, a firing pin and a time safety device comprising ring having a plurality of inwardly extending members formed integrally therewith and in the plane of said ring, and each forming a clamping jaw for engaging said pin and each member joining said ring by a narrow neck deformable under the action of centrifugal force to permit outward movement of said member, each member being formed with a recess at one side and a projection at the other, the projection of one member normally lying in the recess of the next member to prevent said movement of one of said members until the other has moved, the projection of one of said members being bent out of its corresponding recess and all of said members, except for said bend, being identical.

2. The percussion fuses as set forth in claim 1 wherein an additional ring with inward projecting members is provided in a plane parallel to the plane of said first mentioned ring, said latter ring and members being of the same construction as said first named ring and members and the bent projection of one ring member engaging in a recess in the other ring member.

HELMUT JUNGHANS.