

June 9, 1953

R. APOTHÉLOZ

2,641,186

FUSE

Filed Oct. 29, 1948

2 Sheets-Sheet 1

Fig. 1

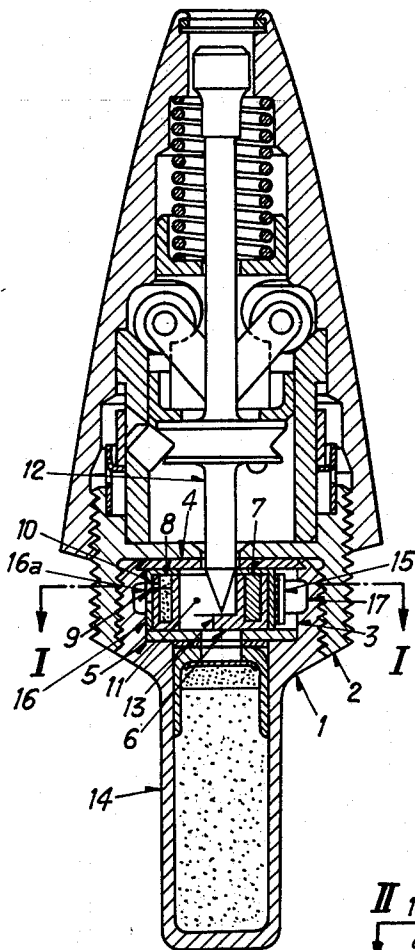


Fig. 2

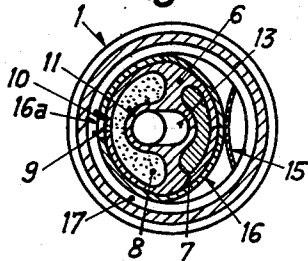


Fig. 4

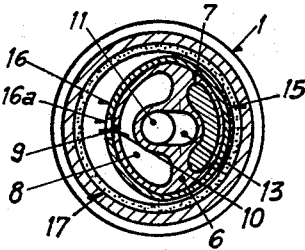
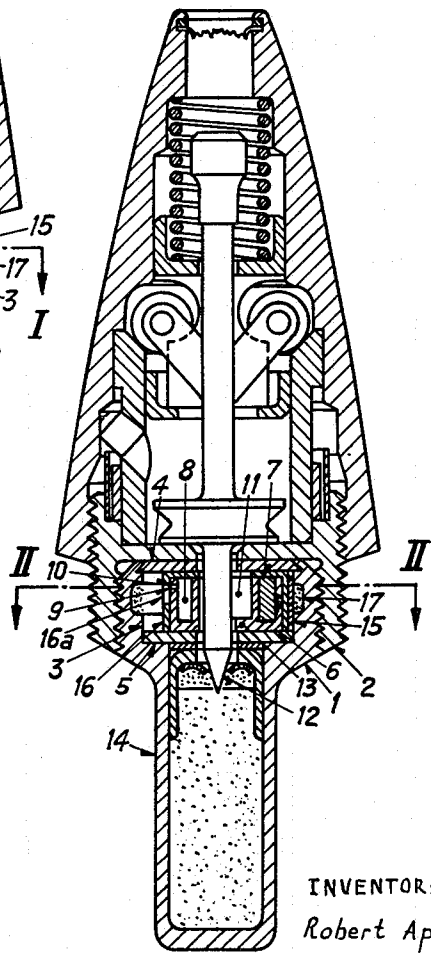


Fig. 3



INVENTOR:

Robert Apothéloz

BY

Richard J. Feier

ATTORNEYS

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Fig. 5

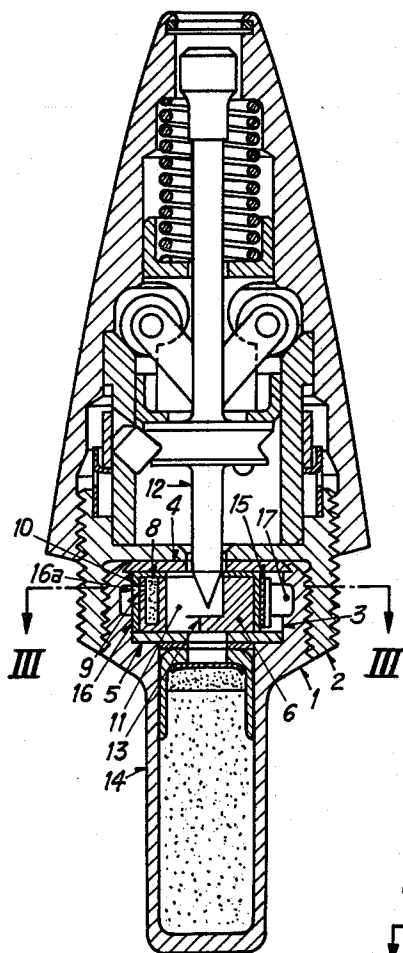


Fig. 8

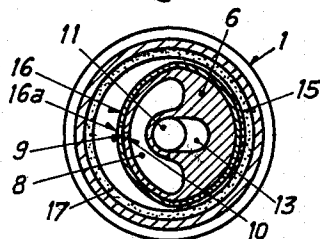


Fig. 7

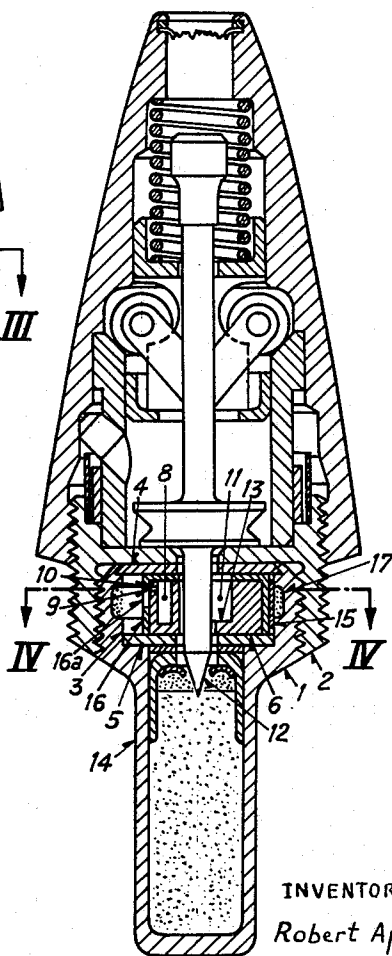
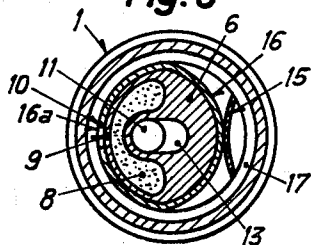


Fig. 6



INVENTOR:

Robert Apothéloz

By

Richard J. Feier

ATTORNEYS

UNITED STATES PATENT OFFICE

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FUSE

Robert Apothéloz, Zurich, Switzerland, assignor
to Machine Tool Works Oerlikon Administration
Company, Zurich-Oerlikon, Switzerland,
a company of Switzerland

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1 Claim. (Cl. 102—79)

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One of the most essential requirements of fuses is the elimination of the danger of premature detonation in the vicinity of the barrel. Many types of fuses are known which have been designed to this end and which guarantee with more or less simple means the prevention of premature detonation. In each case, however, the fuse requires special construction.

The present invention relates to a detonating cap proof against premature detonation which meets the requirement of safety from premature detonation with a fuse of any design whatsoever.

The detonating cap ensuring safety both in transport and in the vicinity of the barrel in accordance with the present invention is characterised by the fact that it is provided with a body disposed so as to be displaceable transversely to the fuse axis in a recess and sealing the aperture to be pierced by the fuse striker when in the transportable state, which body bears at one side on a spring and is forced by the latter against the opposite wall, and is provided at its side opposite the buffer spring with a cavity filled with a heavy yet liquid material, which cavity is connected via a small bore, through which the filling material can be expelled under the action of centrifugal force, to a cavity disposed in the body of the detonating cap and serving to accommodate the heavy liquid material discharged under the action of centrifugal force, the whole being arranged in such a way that, after the discharge of the heavy, liquid material, the centre of gravity of the body is so displaced that the body is moved, under the action of centrifugal force, in opposition to the spring and thus releases the striker.

In the enclosed drawing two typical embodiments of the invention are represented as follows:

Fig. 1 a section through a fuse with the detonating cap in the transportable state;

Fig. 2 a section along the line I—I in Fig. 1;

Fig. 3 a section through the fuse as in Fig. 1, showing the position of the individual components subsequent to ignition;

Fig. 4 a section along the line II—II in Fig. 3;

Fig. 5 a section through a fuse with the detonating cap in the transportable state according to a second embodiment;

Fig. 6 a section along the line III—III in Fig. 5;

Fig. 7 a section through the fuse as in Fig. 5, showing the position of the individual components subsequent to ignition;

Fig. 8 a section along the line IV—IV in Fig. 7.

The fuse represented in the drawing may be of any desired design.

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The detonating cap body 1 is screwed into the fuse 2 in the known manner. In a recess 3 of the detonating cap body 1, which is sealed by a plate 4, the sealing body 6 is displaceably mounted on a plate 5 provided at the bottom of the bore. The external shape of the body 6 is such as is produced by the placing together of two halves each forming almost a semicircle, as shown in Fig. 2. In one of the halves a recess 7 is provided which is filled with a heavy material such as lead. In the opposite half a recess 8 is likewise provided, into which a lateral aperture 9 opens which is sealed by means of a diaphragm or membrane 10. The recess 8 is filled with a likewise heavy, but liquid material, such as mercury for instance. The body 6 has a central slot 11 in which the striker 12 of the fuse engages. A shoulder 13 protruding into the slot 11 seals, however, the aperture leading to the primer 14, so that the striker 12 is prevented from penetrating into the primer when in the transportable state, even if its other safety devices have been removed. The body 6 is finally forced by a leaf-spring 15 disposed in the recess 3 against the side of the recess 3 opposite the leaf-spring 15. The body 6 is sealed by a cap 16, which likewise has an aperture 16a communicating with the aperture 9, sealed by a diaphragm 17, of the body 6. In the detonating cap body 1 a cavity 17 is provided inside the recess 3. The diaphragm 10 may also be dispensed with if the aperture 9 is of such small dimensions that the mercury cannot, in the normal way and under the effect of any jolting which may occur during transport, flow out but is only expelled under the action of centrifugal force.

The mode of operation of the detonating cap proof against premature detonation in accordance with Figs. 1-4 is briefly as follows:

When the projectile is fired, the body 6 is first held in the position represented in Fig. 2, as the weight of the mass accommodated in the recess 8 is greater than that of the mass provided in the recess 7. Under the action of the centrifugal force, however, the diaphragm 10 is now pierced and the heavy yet liquid material, for example mercury, flows slowly out of the recess 3 into the cavity 17. If the safety devices of the fuse become armed, for example, ignition can nevertheless not yet take place because access to the primer 14 is blocked for the striker 12 by the shoulder 13 in the body 6. Once the material provided in the recess 8 has flown out into the cavity 17, only the heavy material provided in the recess 7 remains operative, causing the leaf-spring 15 to be compressed under the action of centrifugal

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force and enabling the body 6 to perform a movement into the position represented in Fig. 4. In this position the shoulder 13 opens the way to the primer for the striker 12 and ignition can take place.

In Figs. 5-8 a second typical embodiment is represented. In contrast to the embodiment as in Figs. 1-4, the recess 7 is here eliminated. The body is fashioned in such a way that, after discharge of the mercury from the recess 8, the centre of gravity is displaced and the body 6 assumes the position shown in Figs. 7 and 8. The mode of operation is therefore the same as in the case of the embodiment in accordance with Figs. 1-4.

By virtue of the present invention any fuse whatsoever which is not provided with special devices to ensure the prevention of premature detonation in the vicinity of the barrel may be rendered proof against such premature detonation. As the construction of the detonating cap is moreover extremely simple, a considerable reduction in cost and an appreciable simplification is achieved in comparison with existing fuses designed to prevent premature detonation.

I claim:

A detonating cap for projectile fuses, said cap comprising, in combination with a striker and a primer, a hollow body, a plate at the bottom of said hollow body, a sealing body displaceably mounted on said plate and having two curved halves, one of said halves being of substantially heavy weight, the other one of said halves hav-

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ing a recess and an aperture formed therein, a diaphragm sealing said aperture from said recess, said recess being adapted to be filled with heavy liquid material, said hollow body having a recess formed therein and communicating with the recess of the sealing body when said diaphragm is pierced, said sealing body further having a passage formed therein, and a shoulder separating said striker from said primer in the inoperative position of said sealing body, and a spring engaging said sealing body to shift it from said inoperative position to an operative position when the heavy liquid material has flown through said aperture from the recess of the sealing body into the recess of the hollow body, said passage establishing a communication between said striker and said primer in said operative position.

ROBERT APOTHÉLOZ.

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