

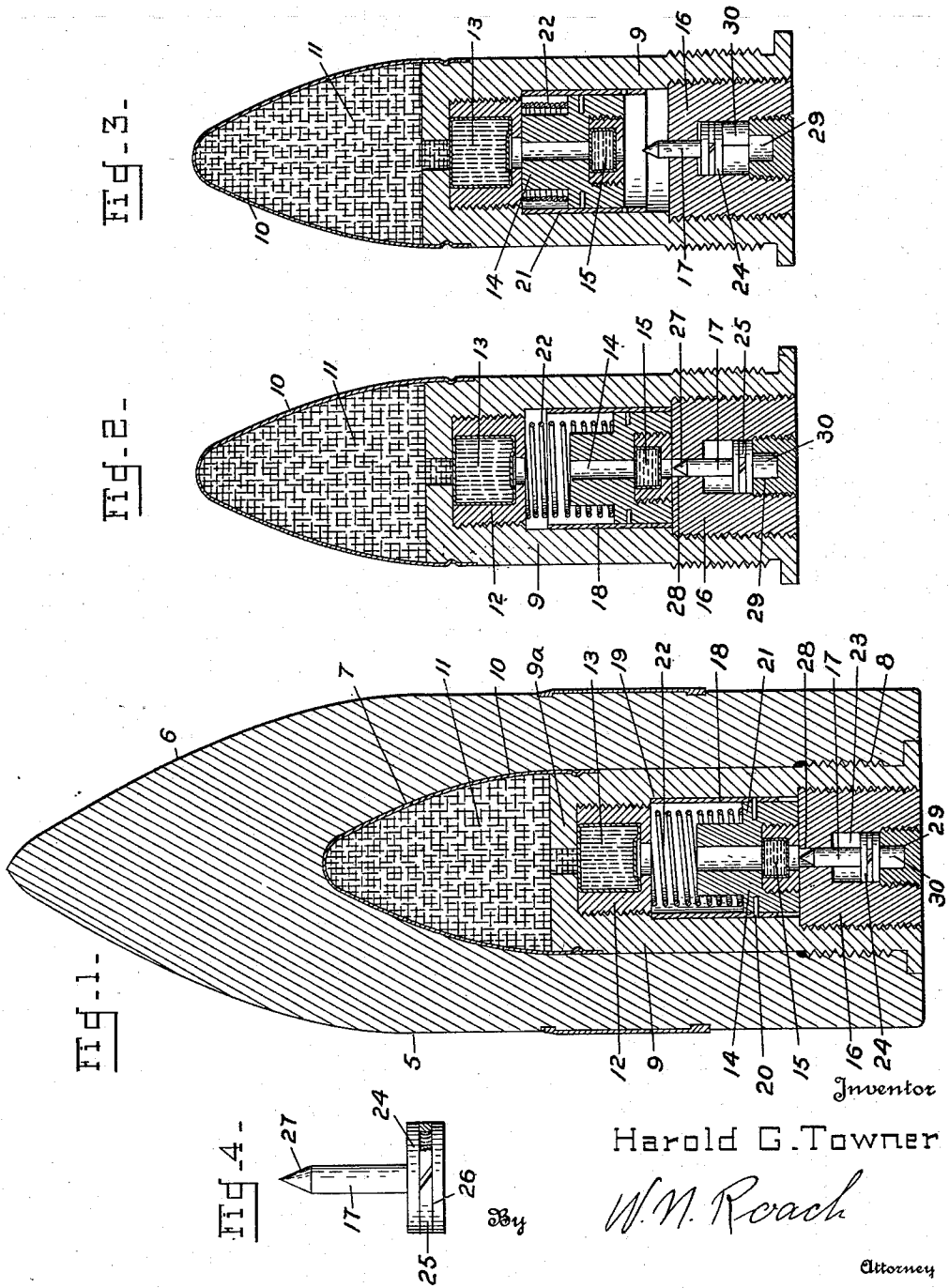
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EXPLOSIVE SHELL AND A FUSE THEREFOR

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EXPLOSIVE SHELL AND A FUSE THEREFOR

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The invention described herein may be manufactured and used by or for the Government for governmental purposes, without the payment to me of any royalty thereon.

This invention relates to an explosive shell and a fuse therefor.

In shells for the minor caliber guns, such as the 37mm, the general purpose fuse is of the percussion or detonating type necessarily of reduced size and affording instantaneous action on impact. The shell is fused at the time of loading and is stored and transported in this condition.

One of the objects of the present invention is to provide for a mechanical delay action in a fuse of this character without complicating the structure or increasing its size. The matter of size is of vital importance because of the small space available for the bursting charge in a shell of this caliber.

In arranging for the separate storage and transportation of the fuse and the shell, it is proposed according to this invention, to associate the bursting charge with the fuse. By virtue of this disposition a uniformly sized chamber in the shells may interchangeably accommodate different classes or types of fuses carrying varying bursting charges. Furthermore, the metal components of the complete shell may be accumulated in time of peace and the loading with explosives performed as the facilities and the occasion require.

With the foregoing and other objects in view, the invention resides in the novel arrangement and combination of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed may be made within the scope of what is claimed without departing from the spirit of the invention.

A practical embodiment of the invention is illustrated in the accompanying drawing, wherein:

Fig. 1 is a longitudinal sectional view of a shell assembled in accordance with the invention and equipped with the improved fuse;

Fig. 2 is a similar view of the fuse showing

the firing pin in unarmed position with the set back sleeve disengaged;

Fig. 3 is a similar view of the fuse showing the parts in armed position on impact; and

Fig. 4 is a detail view in elevation of the firing pin.

Referring to the drawing by numerals of reference:

There is shown a projectile consisting of a shell 5 having the thick nose 6 which is a characteristic provision for piercing armor. The cavity or chamber 7 of the shell conforms substantially to the shape of the shell and opens into the base thereof. At the mouth 8 of the cavity the shell is threaded for attachment of a cylindrical fuse body 9 on whose forward extremity is secured, as by crimping, a thin case or thimble 10 inclosing a bursting charge 11. The fuse unit when inserted in the shell completely occupies the chamber 7.

The fuse body 9 is a tubular member which may, as in the present instance, be formed with a diaphragm 9a at its forward extremity. The fuse body is arranged to successively receive a plug 12 carrying a detonator 13, a hollow percussion plunger 14 carrying the primer 15 and a base plug 16 housing a firing pin 17. The end plugs 12 and 16 are spaced to provide a chamber in which the plunger may have a freedom of longitudinal movement sufficient for its operation.

The plunger is normally held immovable in unarmed position by means of a set back sleeve 18 supported at its forward end 19 by the fuse body and secured to the plunger by means of shear pins 20. The forward portion of the plunger is reduced to provide an annular shoulder 21 forming a seat for a plunger spring 22 which is confined by the detonator plug 12.

The base plug 16 contains a chamber 23 for housing the enlarged base 24 of the firing pin and limiting its movement axially of the fuse. A resilient split ring 25 placed in an annular groove 26 in the periphery of the base 24 engages the wall of the chamber 23 to normally hold the firing pin in the retracted position with its point 27 disposed

in the opening 28 in the base plug directly behind the primer 15.

A small recess 29 in the base plug which is in communication with the chamber 23 immediately in rear of the firing pin receives a locking member 30 which is conveniently formed of a small section of a metal rod. This member will move forward with the firing pin due to its inertia arising from retardation of the shell on impact and when restrained against continued forward movement by the arresting of the firing pin it will be thrown outwardly towards the wall of the chamber 23 through the action of centrifugal force and maintained there in a position to prevent its return to the recess 29 and to engage behind the firing pin and insure its retention in the armed position with its point extruding from the base plug.

During this action the plunger, which has been released when the sleeve 18 moves to the rear on set back to shear the pins 20, likewise moves forward due to its inertia and compresses the spring 22. When the force of inertia has diminished sufficiently to permit the spring to predominate the plunger will be driven rearwardly to its original position. During the period of delay thus mechanically obtained, the firing pin is moved to the armed position and being held by the member 30, it will strike and penetrate the primer carried by the plunger. The flash from the primer will pass through the hollow plunger and function the detonator 13 which, in turn, sets off the bursting charge 11.

I claim:

1. A fuse comprising a tubular body, a plug in each end of the body, a detonator carried by one plug, an inertia movable firing pin in the other plug, said firing pin normally retracted when unarmed and extruded when armed in the direction of the detonator, locking member through inertia to a position behind the extruded firing pin and centrifugally held against return, a hollow percussion plunger disposed between the plugs, a primer carried by the plunger, a spring confined between the plunger and detonator plug and a sleeve movable on setback for normally holding the plunger immovable.

2. A fuse comprising a tubular body, a plug in each end of the body, a detonator carried by one plug, an inertia movable firing pin in the other plug, said firing pin normally retracted when unarmed and extruded when armed in the direction of the detonator, means for maintaining the firing pin in extruded position, a hollow percussion plunger disposed between the plugs, a primer carried by the plunger, a spring confined between the plunger and detonator plug and a sleeve movable on setback for normally holding the plunger immovable.

3. A fuse comprising a tubular body, a plug in each end of the body, a detonator carried by one plug, an inertia movable firing pin in the other plug, said firing pin normally retracted when unarmed and extruded when armed in the direction of the detonator, means for maintaining the firing pin in extruded position, a hollow percussion plunger disposed between the plugs, a primer carried by the plunger, a spring confined between the plunger and detonator plug and means disengageable from the plunger for normally holding the plunger immovable.

4. A fuse comprising a tubular body, a plug in each end of the body, a detonator carried by one plug, an inertia movable firing pin in the other plug, said firing pin normally retracted when unarmed and extruded when armed in the direction of the detonator, means for maintaining the firing pin in extruded position, a hollow percussion plunger disposed between the plugs, a primer carried by the plunger and a spring confined between the plunger and detonator plug.

5. A fuse comprising a body, an inertia movable firing pin normally in unarmed position, means initially movable in the direction of the firing pin for maintaining the firing pin in armed position, an inertia movable plunger normally in armed position, a spring normally urging the plunger to armed position, and a primer carried by the plunger.

6. A fuse comprising a body, an element of a firing mechanism within the body normally unarmed and moved to armed position on impact, means for maintaining said element in armed position, a second element of a firing mechanism associated with said first named element, means holding said second element against movement released by set back and resilient means tensioned by movement of said second element to armed position on impact to force the element toward the first named element and fire the fuse.

7. A fuse comprising a body, an inertia movable firing pin normally in unarmed position movable on impact to armed position, means for maintaining the firing pin in armed position, an inertia movable plunger normally in armed position, means operable by set back to release the plunger, a spring tensioned on impact to arm the plunger, and a primer carried by the plunger.

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