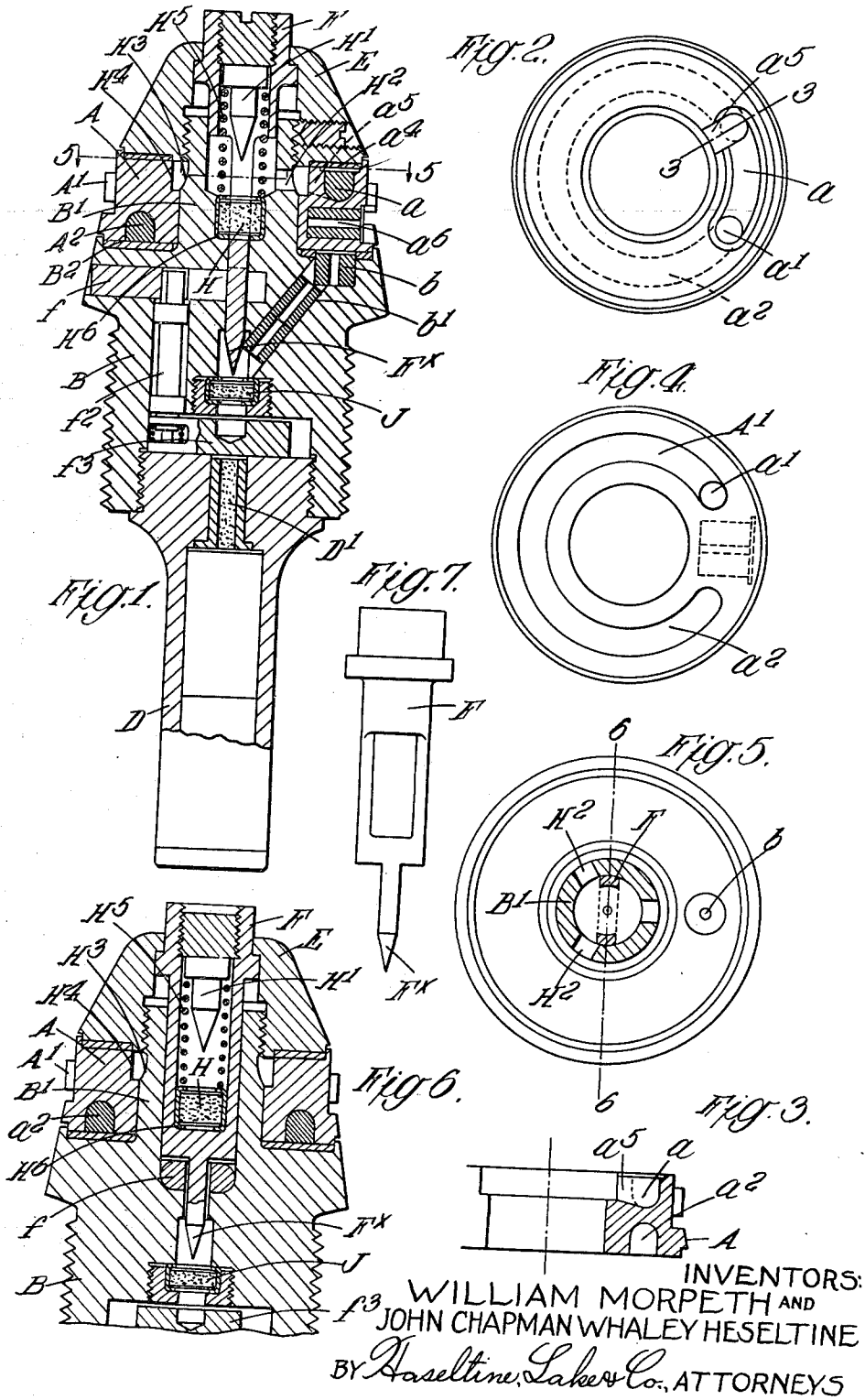


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FUSE FOR PROJECTILES

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FUSE FOR PROJECTILES

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This invention relates to fuses for projectiles of the type provided with a timing action striker and priming cap held apart by a spring, and a direct action striker which normally extends beyond the forward end of the remainder of the fuse and is arranged for movement on impact axially of the fuse.

It is of great importance that a fuse of this kind should be constructed so that the direct action striker cannot be actuated inadvertently before the shell is fired or before the shell has left the barrel of the gun from which it is fired, or by the shock of discharge. For the purpose of guarding against such danger a movable safety device normally can be located in such a position that it can be engaged by the direct action striker to prevent the latter from moving rearwardly into the priming cap or detonator. The safety member may act as or control a shutter that normally prevents ignition of the main explosive of the fuse. The safety device may be arranged to move out of the path of the direct action striker during flight of the shell, for instance, by centrifugal action. There is, however, a real danger that on shock of discharge the direct action striker will press very firmly against the safety device and will lock the latter during flight of the shell and the direct action striker, therefore, may not operate on impact and the main explosive may not be ignited either by the timing action or by the direct action.

Furthermore, it is necessary to have a direct action striker of light weight so that it is very sensitive and the parts attached to this striker must, therefore, also be as few and as light in weight as possible.

The present invention is, moreover, especially concerned with fuses for small type shells in which there is great difficulty in designing the parts to occupy small space without rendering manufacture too difficult.

The main object of the present invention is to achieve the advantages and overcome the defects above referred to.

According to the invention, the aforesaid spring is not only in compression between the timing action striker and said priming cap to hold them apart but is at the same time in compression between the movable member or direct action striker and another part of the fuse so as to press the movable member forwardly of the fuse to relieve the pressure of the movable member from a movable safety device of the fuse. This arrangement is combined with a fuse in which the said movable member is cut away be-

tween its ends to receive the timing action striker, priming cap and spring. Said movable member also carries a firing point on its inner end.

The timing action striker is preferably arranged coaxially with respect to said movable member.

The timing action may include a composition ring having a "safety zone" in one end surface in communication by an aperture through the ring with another composition channel in its opposite end surface and in communication with an escape hole.

In order that the said invention may be clearly understood and readily carried into effect the same will now be described more fully with reference to the accompanying drawing in which:—

Figure 1 is a central sectional view of a fuse made in accordance with the invention;

Figure 2 is a top plan view of the composition ring;

Figure 3 is a sectional view on the line 3—3 on Figure 2;

Figure 4 is an underneath plan view of the composition ring;

Figure 5 is a sectional view on line 5—5 on Figure 1 with the composition ring removed;

Figure 6 is a sectional view on line 6—6 of Figure 5;

Figure 7 is a side elevational view of the movable member or direct action striker shown in front elevation in Figure 6.

The movable member or direct action striker F having the firing-pin F^x on its inner end is of light weight and projects forwardly of the remainder of the fuse so that it is struck back on meeting an obstruction. The striker F is hollow and is cut away on each side at its inner part to accommodate a timing action striker H¹, a priming cap H, and a spring H⁵, all arranged coaxially with respect to the striker F, the firing point F^x of the striker F being located rearwardly of the striker H¹. The striker F is normally prevented from moving rearwardly by the bifurcated end of a movable safety device or bolt f which moves radially by centrifugal action after the projectile leaves the gun and when permitted to move by a shaped pin f² actuated by a centrifugally operated shutter f³. The parts f, f² and f³ are more fully described in the specification of our application No. 440,338. The striker F is supported by the spring H⁵ when the bolt f has moved out. The shutter f³ normally separates a priming cap or detonator J from the relay or detonation train D¹ leading to the gainé. The direct action striker is arranged to fire the cap J

on impact if this has not been previously ignited by the time fuse.

The spring H^5 is in compression between the timing action striker point H^1 and the cap H (which cap is seated upon a shoulder or platform H^6 on the fuse body) so as to hold these parts normally away from each other. This seating of the cap H on the shoulder H^6 is made possible by cutting away the sides of the hollow movable member F and enables the spring H^5 to be also in compression between the fuse body and the movable member or direct action striker F so as to press the member F forwardly to prevent the member F from pressing rearwardly on the movable safety device f hard enough to lock the latter against outward movement during flight of the shell.

The reference letter A indicates the composition ring which surrounds the reduced and hollow end or spigot B^1 of the fuse body B which is threaded on to the gaine D which contains the main explosive elements of the fuse. The ring rests upon the annular platform formed by the reducing of the part B^1 , a cloth washer B^2 being interposed between the ring and platform.

The safety zone channel a is short and arcuate and extends over about 60° to 90° . It is formed in the upper end surface of the ring, i. e., in the surface farthest away from the projectile. This channel is connected by a hole a^1 passing through the ring to the main composition channel a^2 formed in the under surface of the ring. The channel a^2 is in the form of a broken ring extending over about 340° so as to leave a blanking space between its ends to cover a powder pellet b in the body B in the "safe" position of the ring so that in this position the composition in the channel a^2 cannot ignite the powder pellet b . The pellet b serves to fire the powder pellets b^1 . The safety zone channel is so-called because it will provide for a sufficient time interval to ensure that the shell will not explode until said shell is a safe distance from the gun. The other channel provides for any practical time interval in conjunction with the time for the safety zone.

The safety zone channel a is closed on its outer or upper side by a plate a^4 and the flat surface of a cap E screwed on to the spigot B^1 presses the ring against the platform referred to. The composition in the safety channel is ignited by a priming cap H which is itself ignited by a spring supported striker H^1 which sets back or retracts on discharge of the projectile. The channel a is in constant communication with the cap H through fire holes H^3 in the spigot B^1 , and through annular grooves H^4 , H^5 , in the spigot and ring respectively, and then through a channel a^5 in the ring. The lighting point of the safety zone channel (i. e. the point adjacent to the channel a^5) is provided with a suitable ignition pellet or mealed powder. The lighting point of the safety zone channel is connected by a hole with an escape hole a^6 containing a powder pellet.

The ring A is rotatable to vary the fuse timing

and for this purpose is provided with circumferential teeth A^1 to engage the setting rack of the fuse setter in automatic guns, or to engage a setting key. The ring and the fuse body may be suitably marked to indicate fuse timings and the safety position of the ring may be determined in relation to a mark on the bolt f .

In the safety position of the ring the powder pellet b is covered by the blanking part of the ring A between the ends of the channel a^2 .

What we claim and desire to secure by Letters Patent of the United States is:—

1. In a fuse for a projectile provided with a fuse body, a movable member projecting forwardly from the fuse body, a direct action striker at the inner end of said movable member, a timing action striker normally located at the forward end of a hollow portion within said movable member, a cap also located within the hollow portion of said movable member but supported upon the body of the fuse, said cap being positioned in line with the timing action striker, a spring arranged in compression between the timing action striker and the cap, said spring also serving to hold the said movable member forwardly of the fuse body, and a safety device which normally operates to positively prevent rearward movement of said movable member.

2. In a fuse for a projectile provided with a fuse body, a movable member arranged to project forwardly from the fuse body, a direct action striker carried at the inner end of said movable member, a timing action striker and cooperating cap therefor located within an axial cutout portion of said movable member, a spring arranged in effective compression between a portion of the fuse body and the timing action striker, said spring thus serving to hold the timing action striker and cap apart and at the same time urging said movable member forwardly of the fuse body, and a safety device which normally operates to positively prevent rearward movement of said movable member.

3. In a fuse for a projectile provided with a fuse body, a movable member arranged to project forwardly from the fuse body, a timing action striker and cooperating cap therefor, a direct action striker provided integrally upon the inner end of said movable member, the latter being between its ends formed with a slot-like aperture for the reception of the timing action striker and the cooperating cap therefor, a seating portion in the fuse body for supporting said cap and for maintaining the cap in alignment with said striker, a spring arranged in compression between said cap and said timing action striker, said spring serving thereby to simultaneously hold said movable member forwardly of the fuse body, and a safety device which normally operates to positively prevent rearward movement of said movable member.

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