March 19, 1946. M. P. WHITNEY 2,397,066

MECHANICAL TIME FUSE

Filed Sept. 8, 1939

Fig. 1

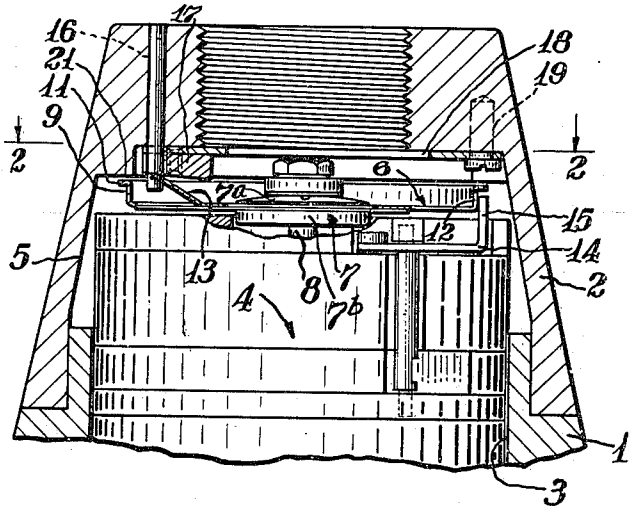


Fig. 2

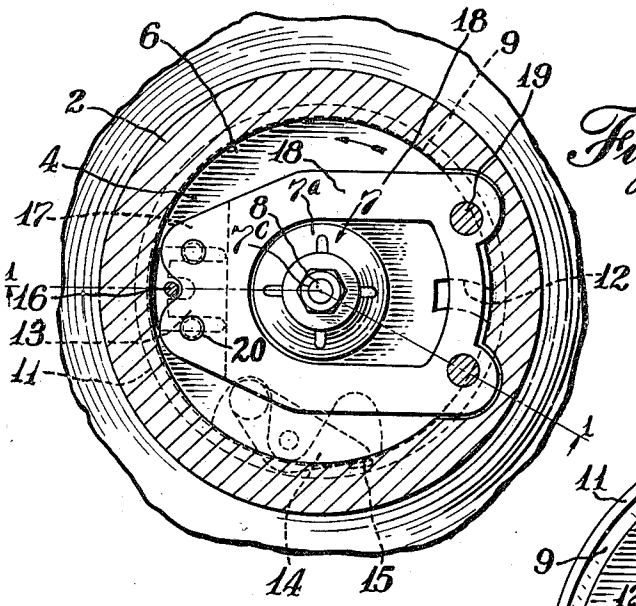
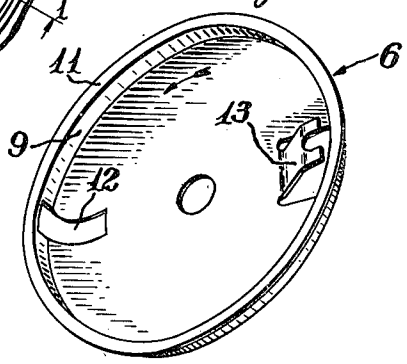


Fig. 3



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MECHANICAL TIME FUSE

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2 Claims. (Cl. 102—83)

The present invention relates to a mechanical time fuse for explosive projectiles and more particularly to the means for controlling the trigger mechanism thereof.

In mechanical time fuses of the type in which a rotary disc is used to time the detonation of the charge, such, for instance, as illustrated in the patent to Junghans 1,693,516, a "secondary setback" of the disc sometimes occurs, which impairs the accuracy of the fuse.

Various structures have been employed to guard against this contingency by confining the disc against longitudinal distortion, but they have in general been subject to the objections of added complication and expense, and possible interference by friction or otherwise with the functioning of the fuse.

It is an object of the present invention to provide a novel mechanical time fuse which is effective and reliable in operation in spite of longitudinal accelerational or decelerational forces.

It is another object to provide such a device incorporating a timing member so formed as to resist the effects of longitudinal accelerational and decelerational forces.

It is a further object to provide such a device in which the timing member is so formed that longitudinal distortion thereof to a considerable degree cannot impair its accuracy.

Another object is to provide such a device incorporating means extraneous to the timing mechanism for positively limiting longitudinal distortion of the timing member.

Another object is to provide such a device in which the chamber for the timing mechanism is so formed as to cooperate with the timing member to positively limit longitudinal distortion thereof.

Further objects and advantages will be apparent from the following description taken in connection with the accompanying drawing in which:

Fig. 1 is a side elevation partly broken away and in section of a portion of a shell case and nose incorporating a preferred embodiment of the present invention, the section being taken substantially along the line 1—1 of Fig. 2;

Fig. 2 is a section taken substantially on the line 2—2 of Fig. 1; and

Fig. 3 is a detail in perspective of the timing disc.

In Fig. 1 there is illustrated at 1 a portion of a shell case on which is swiveled a nose 2. The case 1 is provided with a seat or socket 3 for the reception of timing mechanism 4, and the nose 2 is provided with a recess or socket 5 cooperating with the seat 3 to house the timing mechanism 4.

The timing mechanism comprises a dished timing disc 6 rotated by a friction clutch 7 from a shaft 8 of any suitable form of clockwork mechanism. Clutch 7 may be of any preferred construction and is here shown as comprising a dished washer 7a clamping the timing disc against a flange 7b on shaft 8 by virtue of a clamp nut 7c threaded on the end of said shaft.

According to the present invention, the timing disc 6 is provided with a cylindrical peripheral wall 9 terminating in a radial flange 11. An opening 12 (Fig. 3) is formed in the wall 9 and the web of the disc in a definite angular relation to a forked arm 13 pressed up from said web. A trigger lever 14 which is arranged to control the detonation of the shell in any suitable manner, is provided with an arm 15 bearing on the surface of the wall 9 and arranged to enter the opening 12 therein when it comes into registry therewith.

Setting mechanism for the timing disc 6 is provided in the form of a pin 16 fixedly mounted in the bottom of the recess 5 in the nose 2 and projecting into proximity to the web of the disc in position to be received by the forked arm 13. Means are provided for disconnecting the setting mechanism upon discharge of the projectile in the form of a weight member 17 riveted as shown at 20 to a mounting spring 18 which is fixed as indicated at 19 in the bottom of the recess 5 of the nose. The weight member 17 is arranged directly over the forked arm 13 straddling the pin 16, and when set back by the longitudinal acceleration of the projectile as it is fired, it flattens the forked arm 13 so as to prevent its engagement with said pin.

In order to positively limit distortion of the timing disc 6 to deflections which are substantially less than the height of the cylindrical wall 9, the base of the recess 5 in the nose is provided with an annular shoulder 21 which, when the parts are assembled, is in close proximity to the flange 11 of the timing disc so as to positively prevent deflections of the disc due to deceleration or secondary setback effects.

In operation, when it is desired to use the projectile, the nose 2 is rotated with respect to the case 1 in order to set the timing disc 6 so that its opening 12 is a predetermined angular distance away from the trigger arm 15. It will be understood, of course, that this setting of the timing disc is accomplished by means of a suitable scale and pointer engraved on the nose and case of the shell.

Upon discharge of the shell, the weight member 17 is set back onto the forked arm 13, thus flattening it out and disengaging it from the pin 16 so that the timing disc 6 is free to rotate by the action of the timing mechanism 4.

When the timing disc 6 is rotated by the clockwork until the opening 12 comes into registry with the arm 15 of the trigger, the trigger is released and thereupon permits detonation of the shell.

It will be readily appreciated that timing disc 6 is rendered highly resistant to longitudinal distortion by the formation of the cylindrical wall 9. Moreover, distortion of the disc in amounts less than the height of the wall cannot impair the accuracy of the fuse since the arm 15 of the trigger bears slidably on the outer surface of the wall. Distortion of the disc in amounts large enough to jeopardize the accuracy of the fuse is positively prevented by the shoulder 21 which limits the upward deflection of the disc by acting as an abutment for the flange 11.

Although but one embodiment of the invention has been shown and described in detail, it will be understood that other embodiments are possible and various changes may be made in the design and arrangement of the parts without departing from the spirit of the invention as defined in the claims appended hereto.

What is claimed is:

1. In a mechanical time fuse for explosive projectiles, a trigger member and a clock-work mechanism for controlling the trigger member including a rotary disc having a cylindrical peripheral wall terminating in a radial flange off-set axially from the body of the disc, said wall having an opening therein, but said flange being continuous, said trigger member having an arm adapted to bear on the exterior of the peripheral wall and to enter said opening when the rotary member has turned sufficiently to bring the opening into registry with the arm, said flange being out of the path of movement of the trigger.

2. In combination, a mechanical time fuse for explosive projectiles including a rotary timing disc having a cylindrical wall with an opening therein, said disc also having a continuous flange mounted thereon axially off-set from the body of the disc and extending radially beyond the wall, means mounted in the fuse including a friction clutch for rotating the timing disc, and a trigger member pivotally mounted in the fuse having an arm bearing on said wall and adapted to enter said opening when the rotary disc has turned sufficiently to bring the opening into registry with the arm; and a shell providing a seat for the fuse, said shell having a rotatable nose piece, an axially mounted pin in the nose piece, said disc having a flexible forked arm engaging the pin, said nose piece having a circular recess, a weight member in the recess operative when set back by discharge of the shell to disengage the forked arm from the pin, and said nose piece having a shoulder surrounding the recess adjacent the off-set flange of the timing disc and adapted to limit the longitudinal distortion of the timing disc to an amount substantially less than the height of said cylindrical wall.

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