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REGULATING MECHANISM FOR TIME FUSES

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2 Claims. (Cl. 58—112)

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This invention relates to a regulating mechanism for time fuses.

Time fuses comprise generally an escapement control mechanism for regulating the length of time after the discharge of a projectile from the gun when the projectile will be detonated, and the success of the firing depends upon the accuracy with which the timing mechanism controls the detonation. Such timing mechanisms are subjected to very unusual conditions and on this account are quite special to this field. They are subjected to abnormal stresses in the firing of the gun, in the rotational acceleration of the gun and in the centrifugal forces resultant from the high speed of rotation. The mechanism, therefore, must be such that application of these forces in sequence will not disturb the accuracy of the firing.

The invention accordingly comprises an article of manufacture possessing the features, properties and the relation of elements which will be exemplified in the article hereinafter described and the scope of the application of which will be indicated in the claims.

For a fuller understanding of the nature and objects of the invention, reference should be had to the following detailed description, taken in connection with the accompanying drawing, in which:

Figure 1 is a plan view of a mechanism embodying this invention with a portion of the frame broken away.

Figure 2 is a fragmentary bottom view of the same.

Figure 3 is a section on the line 3—3 of Figure 1.

Those portions of the time fuse which are concerned with the discharge of the projectile not being involved in this invention are not here described; it is sufficient to state that the frame 10 supports such mechanism, that the frame is held together by screws 11 and that such mechanism ultimately results in the discharge of a firing pin 12 through an opening 13 in the frame.

The timing mechanism is adapted to drive in the forward direction an escapement wheel 14 having teeth 15 adapted to cooperate with verge pins 16 upon a vibrator or balance 17 controlled by a radially disposed hair spring 18. The teeth of the escapement wheel and the verge pins are so shaped relative to each other that the application of force to rotate the escapement wheel will oscillate the balance under control of the hair spring 18.

As will be seen from Figure 3 that portion of the frame 10 with which we are here concerned

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comprises a plurality of plates 20, 21 and 22, the plates 20 and 21 being grooved along their meeting line with semi-cylindrical grooves 23 and 24 terminating in sharp shoulders 25 and 26 and journaled within the bearing formed by the grooves 23 and 24 is a cylindrical portion 27 of the head portion of an adjusting screw 28. This cylindrical portion terminates at one end in a collar 29 adapted to fit against the shoulder 25 and terminates in the other end in a head 30 adapted to fit against the shoulder 26. These parts fit together with a minimum possible clearance so as to avoid lost motion and at the same time to afford a rigid support against the severe force to which it will be subjected in practice. The plate 20 may also be prick punched as shown at 25a to take up the last trace of end shake.

The plate 20 is further provided with an inwardly extending slot 31 within which is carried a movable block 32 having a female thread 33 to receive the male thread 34 on the outside of the screw 28. This block 32 has an upwardly extending ear 35 provided with a slot 36 adapted firmly but slidably to grip the projecting end of the hair spring 18.

As it will be noted a body 37 of the block 32 (see Figure 1) is wider than the slot 31 and rests upon the upper face of the plate 21. The block is provided with a narrower projection 38 which extends down into and slidably fits between the sides of the slot 31.

From the foregoing construction it will be clear that the rotation of the head 30 will draw the ear 35 toward or from the center thereby decreasing or increasing the effective portion of the hair spring 18 and speeding up or slowing down the timing of the device, as the case may be.

This construction in which the screw 28 is firmly held without back lash between the plates 20 and 21 and between the shoulders 25 and 26 and in turn thus rigidly holds the block 32 in position offers marked advantages both from the constructional point of view and from the point of view of insuring the accuracy of the device and because of its added rigidity it maintains the proper location of the hair spring and of the hair spring adjustment block comprising the ear 35, notwithstanding the large strains to which they are subjected in firing the gun. The elimination of all end shake results in increased accuracy of firing as the firing forces will not, through centrifugal action, change the time adjusting mechanism. The drive is also simpler as it eliminates some of the parts heretofore used and adjustment is easier as the screws move without

difficulty. After final adjustment screws can have their heads and slots shellacked in place.

Since certain changes may be made in the above construction and different embodiments of the invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the following claims are intended to cover all of the generic and specific features of the invention herein described and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

Having described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. A regulating mechanism for a time fuse, comprising an escapement wheel; a vibrator operatively connected to said escapement wheel; a straight hair spring connected intermediate its ends to said vibrator; a first plate whereon said vibrator is mounted, a second plate disposed in face-to-face contact with said first plate, said plates having registering semi-cylindrical grooves cooperating to form two axially aligned cylindrical bearings, said bearings lying parallel to said spring and adjacent the ends thereof, each said plate having a slot inwardly adjacent each said groove and aligned therewith; a screw mounted in each said bearing to be rotatable therein, each said screw having shoulder portions disposed to prevent longitudinal movement of the screw, and each said screw having a threaded portion lying in a said slot; and a respective member in each said slot threadedly engaged with each said screw to be positionally

adjustable by rotation of such screw and slidably engaged with said hair spring to vary the effective length of the spring.

2. A regulating mechanism for a time fuse, comprising an escapement wheel; a vibrator operatively connected to said escapement wheel; a straight hair spring connected medially to said vibrator; a first plate whereon said vibrator is mounted, a second plate disposed in face-to-face contact with said first plate, said plates having registering semi-cylindrical grooves cooperating to form two axially aligned cylindrical bearings, said bearings lying parallel to said spring and adjacent the ends thereof, each said plate having a slot inwardly adjacent each said groove and aligned therewith; a screw rotatably mounted in each said bearing, each said screw having shoulder portions disposed to prevent longitudinal movement of the screw, and each said screw having a threaded portion lying in a said slot; and a block threadedly engaged with the threaded portion of each said screw, said blocks being non-rotatably slidable in the respectively adjacent slots and each having a laterally extending portion provided with a slot to slidably receive an end portion of said spring, whereby the effective length of said spring may be varied by rotation of said screws.

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REFERENCES CITED

The following references are of record in the file of this patent:

FOREIGN PATENTS

Number	Country	Date
284,968	Great Britain	Feb. 9, 1928