April 3, 1928. 1,664,676

R. L. GOETZENBERGER

FUSE SETTER

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Fig. 1.

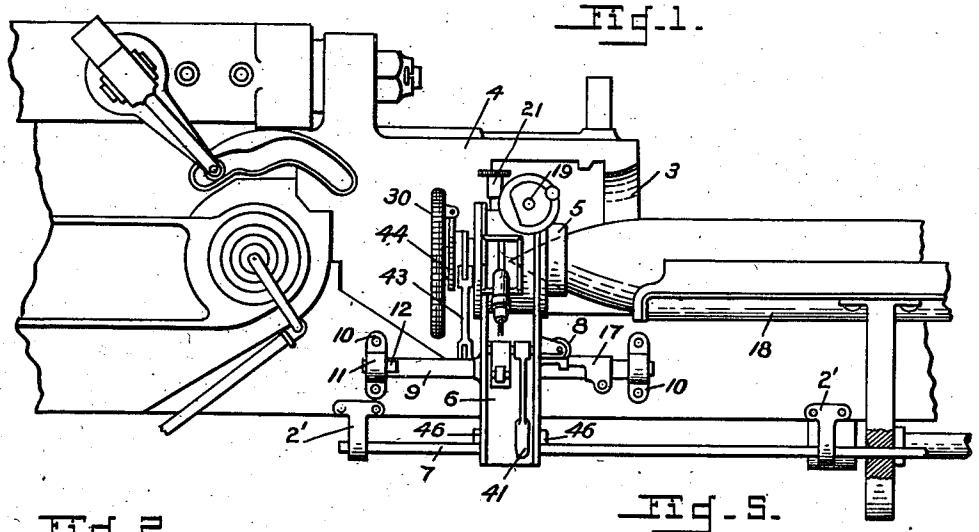


Fig. 2.

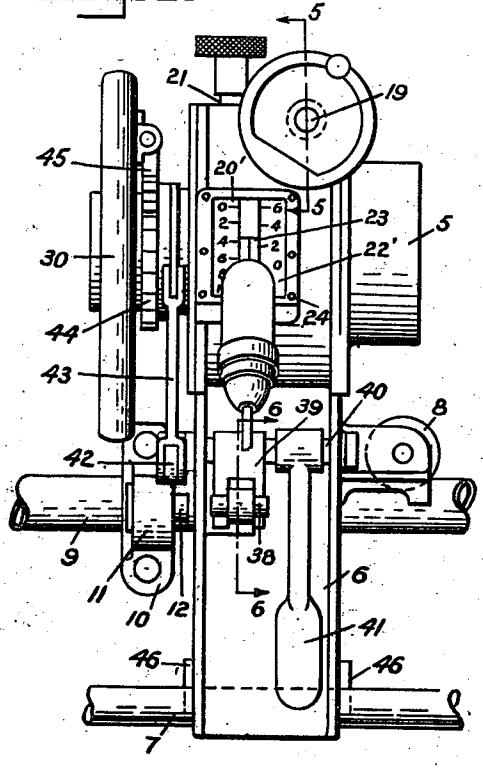


Fig. 5.

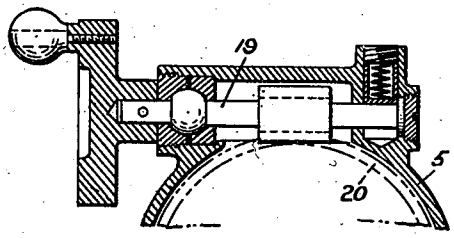
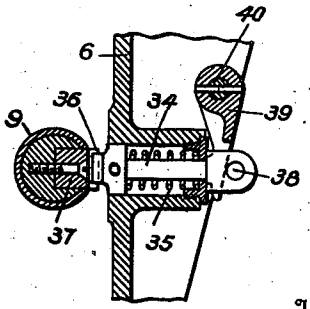


Fig. 6.



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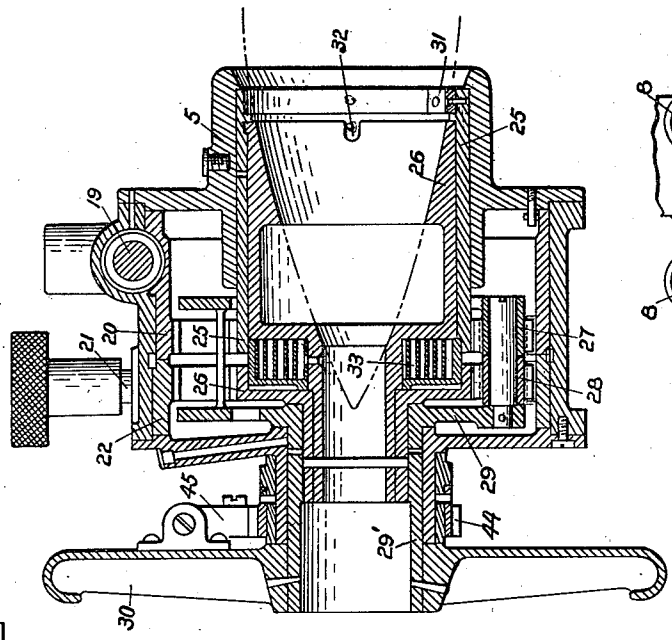


Fig. 4.

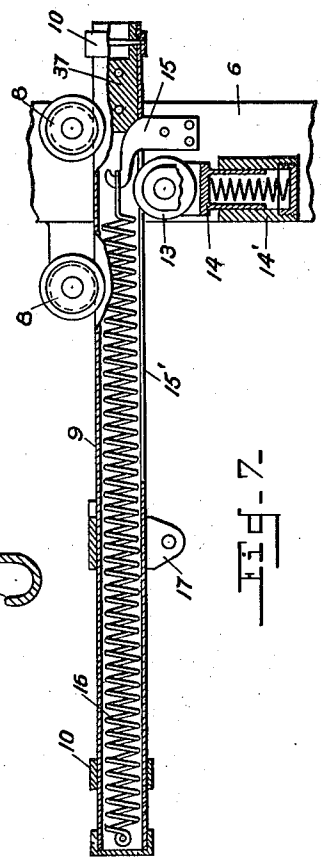


Fig. 7.

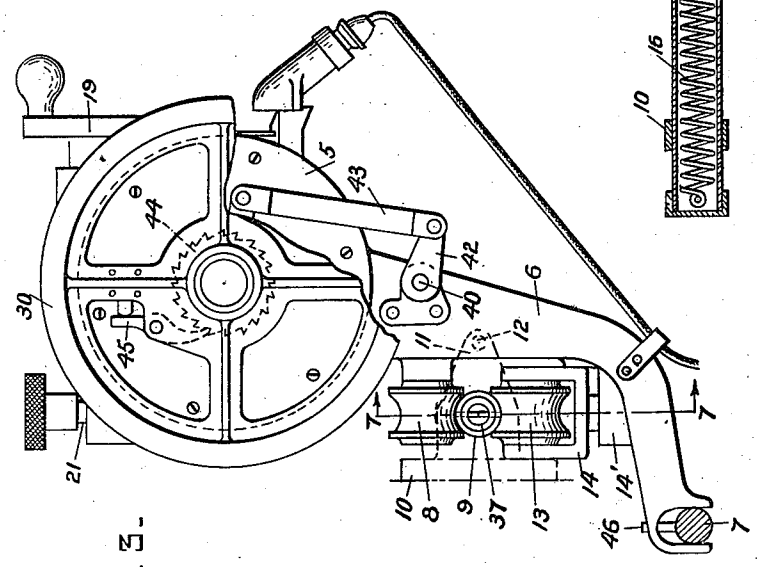


Fig. 5.

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Fig. 8.

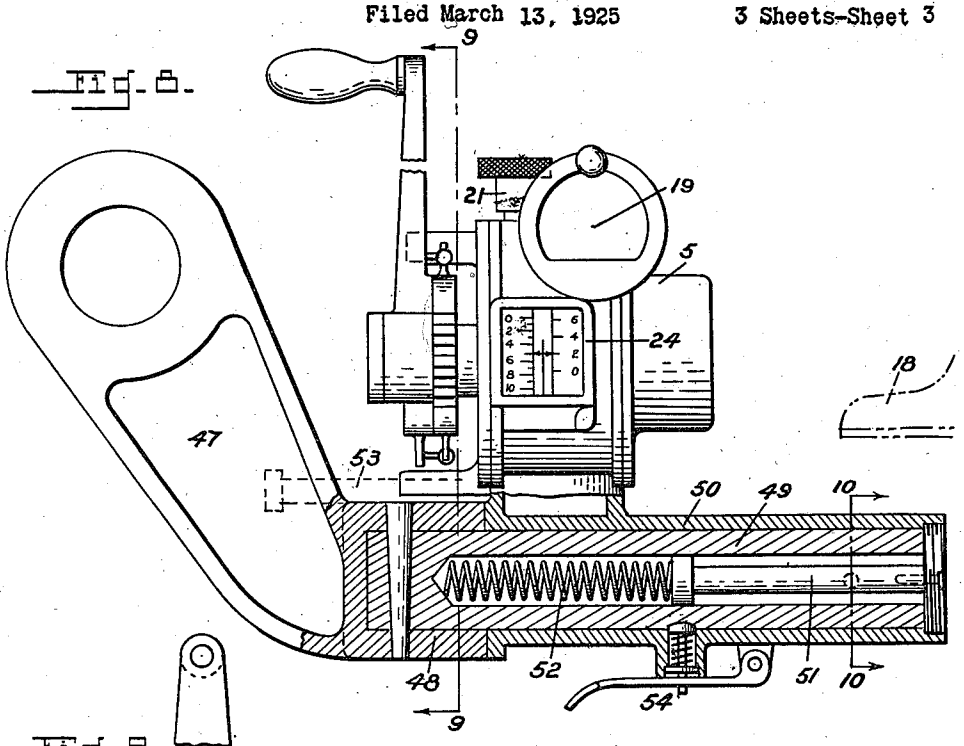


Fig. 9.

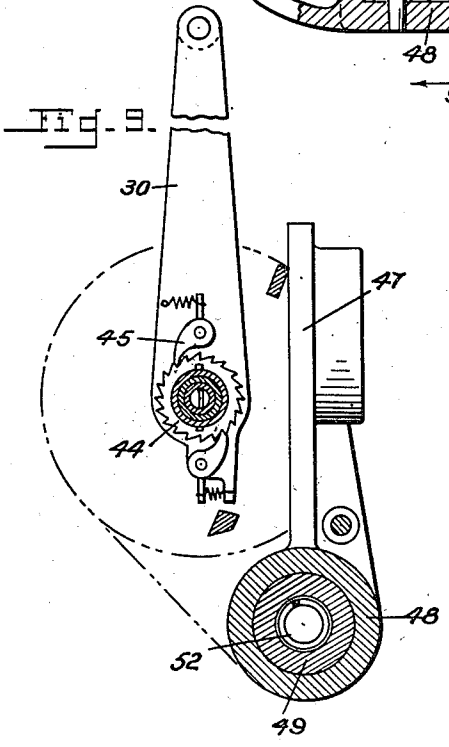
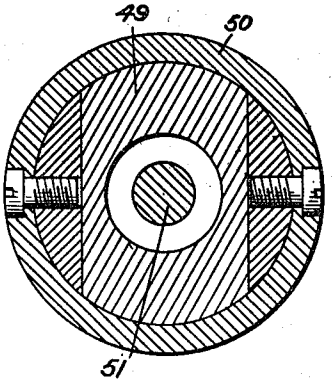


Fig. 10.



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UNITED STATES PATENT OFFICE.

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FUSE SETTER.

Application filed March 13, 1925. Serial No. 15,389.

(GRANTED UNDER THE PROVISIONS OF THE ACT OF MARCH 3, 1883, 22 STAT. L., 625.)

The invention described herein may be used by the Government, or any of its officers or employees in prosecution of work for the Government, or by any other person in the United States, without payment to me of any royalty thereon, in accordance with the act of March 3, 1883.

The subject of this invention is a fuse setter.

In antiaircraft gunnery, the target moves at such a rapid rate that the computation of deflection corrections to allow for time of flight of a projectile and the "dead time", which includes the range data transmission, fuse setting and loading, is susceptible of greater inaccuracy as the total lost time increases. The usual artillery practice in setting fuses is to mount the fuse setter on the caisson, adjust it to the announced setting, insert and manually rotate the projectile.

To reduce the interval of "dead time," it is proposed to mount the fuse setter on the cradle of the gun and permit setting of the fuse after the projectile has been placed in the loading tray. Since these projectiles are of great weight they cannot readily be turned to engage the fuse setter once they are on the tray. Therefore, the fuse setter must be designed so that it is capable of engaging and setting the fuse no matter what may be the location of the stop pins on the body and time train ring of the fuse with respect to the angular position of the projectile on the tray. It may be presumed that all fuses will have been set at safety prior to placing the projectile on the tray, although this is not essential so far as the operation of the fuse setter is concerned.

To these and other ends, my invention consists in the construction, arrangement, and combination of elements, described hereinafter and pointed out in the claims forming a part of this specification.

Several practical embodiments of my invention are illustrated in the accompanying drawings, wherein:

Fig. 1 is a view in side elevation of the breech end of a gun on which is mounted a fuse setter constructed in accordance with the invention;

Fig. 2 is a detail view in side elevation of the fuse setter;

Fig. 3 is a front view thereof;

Fig. 4 is a longitudinal section through the fuse setter;

Fig. 5 is a fragmentary sectional view on the line 5—5 of Fig. 2;

Fig. 6 is a similar view on the line 6—6 of Fig. 2;

Fig. 7 is a sectional view on the line 7—7 of Fig. 3;

Fig. 8 is a longitudinal sectional view of a modified form of supporting means;

Fig. 9 is a sectional view on the line 9—9 of Fig. 8; and

Fig. 10 is a sectional view on the line 10—10 of Fig. 8.

Referring to the drawings by numerals of reference:

The apparatus for setting fuses is mounted on a gun cradle 2 adjacent the breech block opening 3 of the gun 4. The mechanism of the fuse setter is inclosed in a housing 5 formed with an arm 6, the extremity of which fits over a guide rod 7 carried in lugs 2′ of the cradle. The fuse setter is supported by means of a pair of rollers 8 mounted on the arm 6 and resting on a tubular trackway 9 carried by brackets 10 secured to the cradle, the front bracket formed with an extension 11 disposed in the path of the fuse setter and carrying a pin or a buffer 12 for limiting forward movement of the setter. For the purpose of preventing the setter from jumping its track there is provided a roller 13 engaging the under side of the track and carried by a spring actuated support 14 mounted in an enlargement 14′ on the arm 6.

A hook 15 (Fig. 7) fast to the arm 6 and disposed within the track through a slot 15′ receives one end of a spring 16 which is secured to the rear head of the track and serves to draw the setter when released to the rear until arrested by an adjustable stop 17 where it will be in position on the nose of the projectile which has been placed in the loading tray 18 mounted on the cradle 2 for oscillatory movement to position the projectile in line with the bore of the gun.

Mounted in the housing 5 are a pair of worm shafts, the horizontal shaft 19 operating the range worm wheel 20 and the vertical shaft 21 operating the corrector worm wheel 22. The wheels 20 and 22 are provided with peripheral scales 20′ and 22′

adapted to register for reading against a stationary index bar 23 on the dial cover 24. The range scale 20′ completely encircles the range wheel as shown in Figure 4, while the corrector scale obviously requires only a few graduations, which are provided on the corrector wheel opposite the window of the dial cover.

The range and corrector wheels 20 and 22 are internally geared whereby they may drive their respective rings 25 and 26 by means of pinions 27 and 28 mounted on a common shaft in a spider 29, on the hub 29′ of which, is fastened a hand wheel 30. The outer or range ring 25 is provided with a stop 31 positioned in the path of the pin on the fuse body when the setter is in the "on" position. The inner or corrector ring 26 is provided with a slot 32 for receiving the pin on the rotatable time train ring of the fuse. Changing the position of the corrector reading alters the position of this slot thus increasing or decreasing the time of burst and altering the height without changing the range reading. Obviously, if all corrections are included in the announced fuse range the corrector ring is not used and will be set at zero.

Assuming the proper settings to have been made and the setter moved upon the nose of the projectile, the hand wheel 30 is rotated in a clockwise direction, looking to the rear, whence the spider 29 through the pinions 27 and 28 imparts an equi-angular movement to the range and corrector rings 25 and 26. The corrector ring by reason of its engagement with the pin on the time train ring of the fuse effects rotation of that member until the stop 31 on the range ring is brought up against the pin on the fuse body. This gives the time of burning required by the setting as read on the range and corrector indexes.

A spiral spring 33 may be conveniently provided for the purpose of eliminating backlash and lost motion.

Mechanism for latching the fuse setter in the "off" position consists of a bolt or latch 34 (Fig. 6) mounted on the arm and normally urged by its spring 35 into engagement with a catch 36 secured to a plug 37 which closes the front end of the tubular track. The bolt head carries a projecting pin 38 whereby it is withdrawn through a pivotally mounted forked trigger 39. The trigger shaft 40 may be locked by a lever 41 or through the medium of a crank 42 operable through a lever 43 which is connected to a ratchet wheel 44 loosely mounted on the hub of the housing 5. The hand wheel 30 carries a pawl 45 which during counterclockwise rotation of the hand wheel drives the ratchet wheel 44 to elevate the lever 43 and retract the bolt. In moving the fuse setter to the "off" position, the bolt will automatically reengage the catch 36 when the apparatus is brought up against the stop of buffer 12.

In order to prevent damage to the fuse setter, means are provided for interlocking it with the tray 18 so that it will be impossible to move the tray from the fuse setting to the loading position until the fuse setter has been moved clear. This interlocking is accomplished by providing pins 46 on the lower guide rod 7 at either side of the arm 6 so that the rod 7 will be moved correspondingly with the fuse setter. Accordingly, when the fuse setter is moved to the "on" position, the rear end of the rod 7 may enter an aperture in the arm of the tray as shown, or be disposed in the path of rotation of the tray thus preventing throwing of the tray while the fuse setter is on the nose of the projectile. On retracting the fuse setter to the "off" position the rod 7 will be carried along and is of sufficient length so that it will not clear the tray until the setter is in the latched position.

As an alternate method of supporting the fuse setter so as to move in elevation with the gun, there is shown in Figures 8, 9 and 10, a bent arm 47 keyed on one of the trunnions and formed with a socket 48 in which is secured a hollow rod 49. The fuse setter is formed with a sleeve 50 slidable on the rod 49 and has a head 51 on which a spring 52 within the rod acts to hold the fuse setter on the projectile. The fuse setter carries a rod 53, provided with adjustable nuts, working in lugs in the cradle for the purpose of limiting the travel of the setter. In this instance the sleeve 50 may function in lieu of the rod 7 as an interlocking means between the fuse setter and the tray, or the fuse housing 5 may be made to engage the forward end of the tray to accomplish the same purpose. A simple latch mechanism 54 is mounted on the under side of the sleeve for an obvious purpose.

It is apparent that the spring 16 or 52 may equally well be made to retract the fuse setter to the "off" position instead of urging it on to the "on" position, in which event it would be latched in reverse order.

In operation, the fuse setter having been given the announced setting by displacing the range and corrector rings which engage the two pins of the fuse, it is unlatched and forced on the nose of the projectile. The hand wheel which drives both rings simultaneously is turned until its further movement is arrested by contact of the stop 31 with the pin in the fuse body. The fuse has then been set to the same amount as the original displacement of the rings. When these operations have been completed the fuse setter is forced back to its "off" position thereby permitting the tray to be thrown in loading the projectile into the gun.

While in the foregoing there has been illustrated and described such combination and arrangement of elements, as constitute the preferred embodiment of my invention, it is nevertheless desired to emphasize the fact that interpretation of the invention should only be conclusive when made in the light of the subjoined claims.

I claim:

1. In combination with a gun including a pivoted loading tray, a tubular track mounted on the cradle thereof, a fuse setter housing provided with rollers for engaging opposite sides of the track, a range ring and a corrector ring within the housing, means for setting said rings independently, means for rotating them simultaneously, a latch mechanism carried by the housing for holding it in place on the track, said mechanism operable in unlatching through reverse rotation of said last named means, and a guide rod movable with the housing and retained by the cradle for preventing oscillation of the loading tray when the fuse setter is in the "on" position.

2. In combination with a gun including a pivoted loading tray, a track mounted on the cradle thereof, a fuse setter housing slidable on the track, a spring for assisting the movement of the housing in one direction, means for latching the housing, a range ring and corrector ring within the housing, means for setting said rings independently, means for rotating them simultaneously, and means for interlocking the fuse setter and tray when the fuse setter is adjacent the tray.

3. In combination with a gun, a track mounted on the cradle thereof, a fuse setter housing slidable on the track, a spring for assisting the movement of the housing in one direction, means for latching the housing, a range ring and corrector ring within the housing, means for setting said rings independently, and means for rotating them simultaneously.

4. In combination with a gun including a pivoted loading tray, a track mounted on the cradle thereof, a fuse setter housing slidable on the track, a range ring and corrector ring within the housing, means for setting said rings independently, means for rotating them simultaneously and means for interlocking the fuse setter and tray when the fuse setter is adjacent the tray.

5. In combination with a gun, a track mounted on the cradle thereof, a fuse setter housing slidable on the track, a range ring and corrector ring within the housing, means for setting said rings independently, and means for rotating them simultaneously.

6. In combination with a gun, a loading tray pivoted on the cradle, a fuse setter slidably mounted for elevational movement with the cradle and including individually adjustable fuse setting elements, means for simultaneously rotating said elements, and means for interlocking the fuse setter and the tray.

7. The combination with a gun of a fuse setter slidably mounted for elevational movement with the cradle and including individually adjustable fuse setting elements, and means for simultaneously rotating said elements.

8. A fuse setter embodying a pair of adjusting members, means for independently rotating said members, means for simultaneously rotating them in the same direction and gear means of the planetary type available in common to both of said means.

9. A fuse setter embodying a pair of adjusting members, means for independently rotating said members, means for simultaneously rotating them and gear means of the planetary type available in common to both of said means.

10. A fuse setter embodying a pair of adjusting members, means for independently rotating said members, means for simultaneously rotating them in the same direction and gear means available in common to both of said means.

11. In combination with a gun including a pivoted loading tray, a fuse setter mounted on the gun and movable towards the tray and means for interlocking the fuse setter and tray when the setter is in operative relation with respect to the tray.

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