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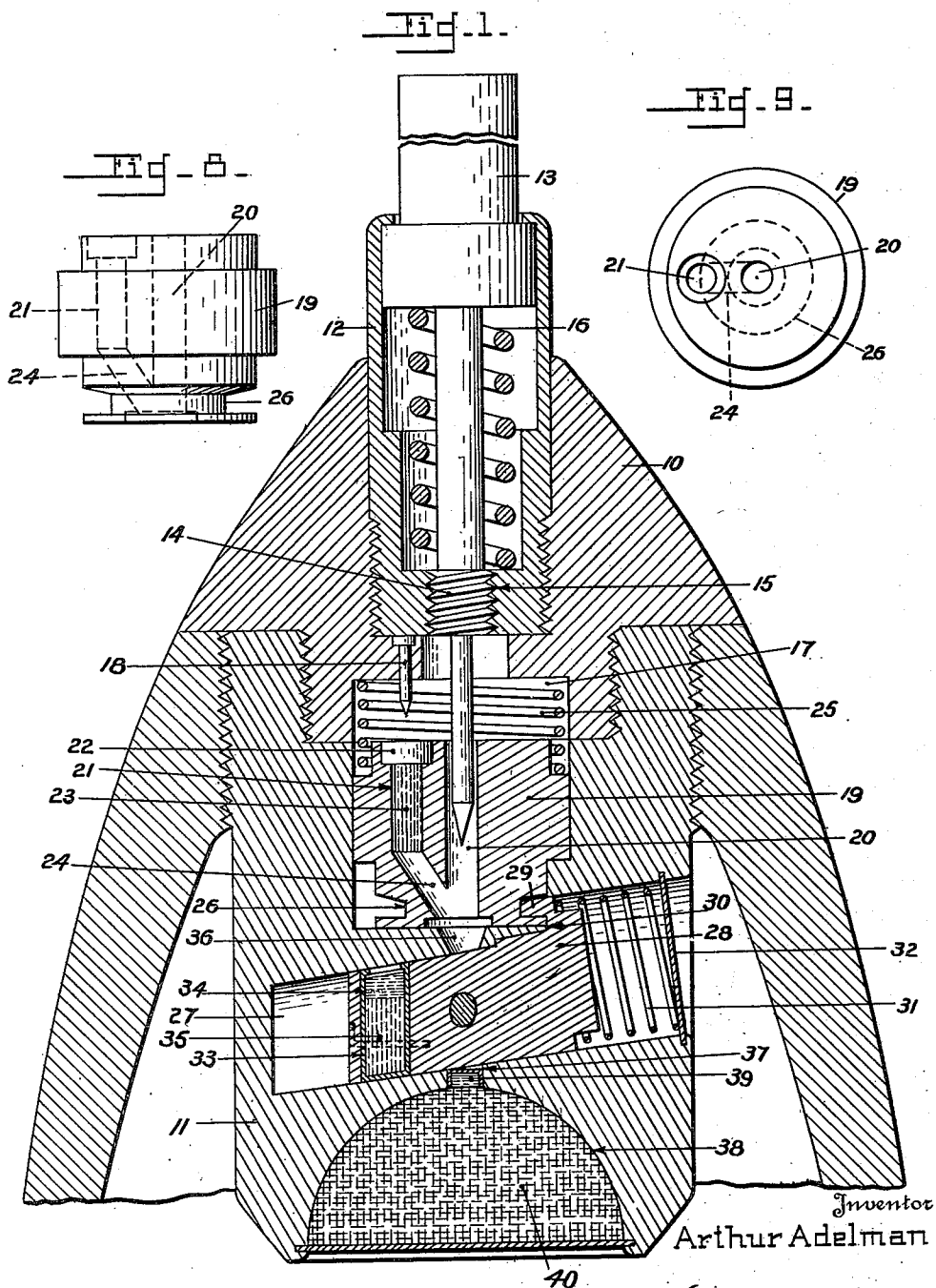
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Filed Feb. 20, 1925

2 Sheets-Sheet 1



Inventor
Arthur Adelman

W. N. Roach
Attorney

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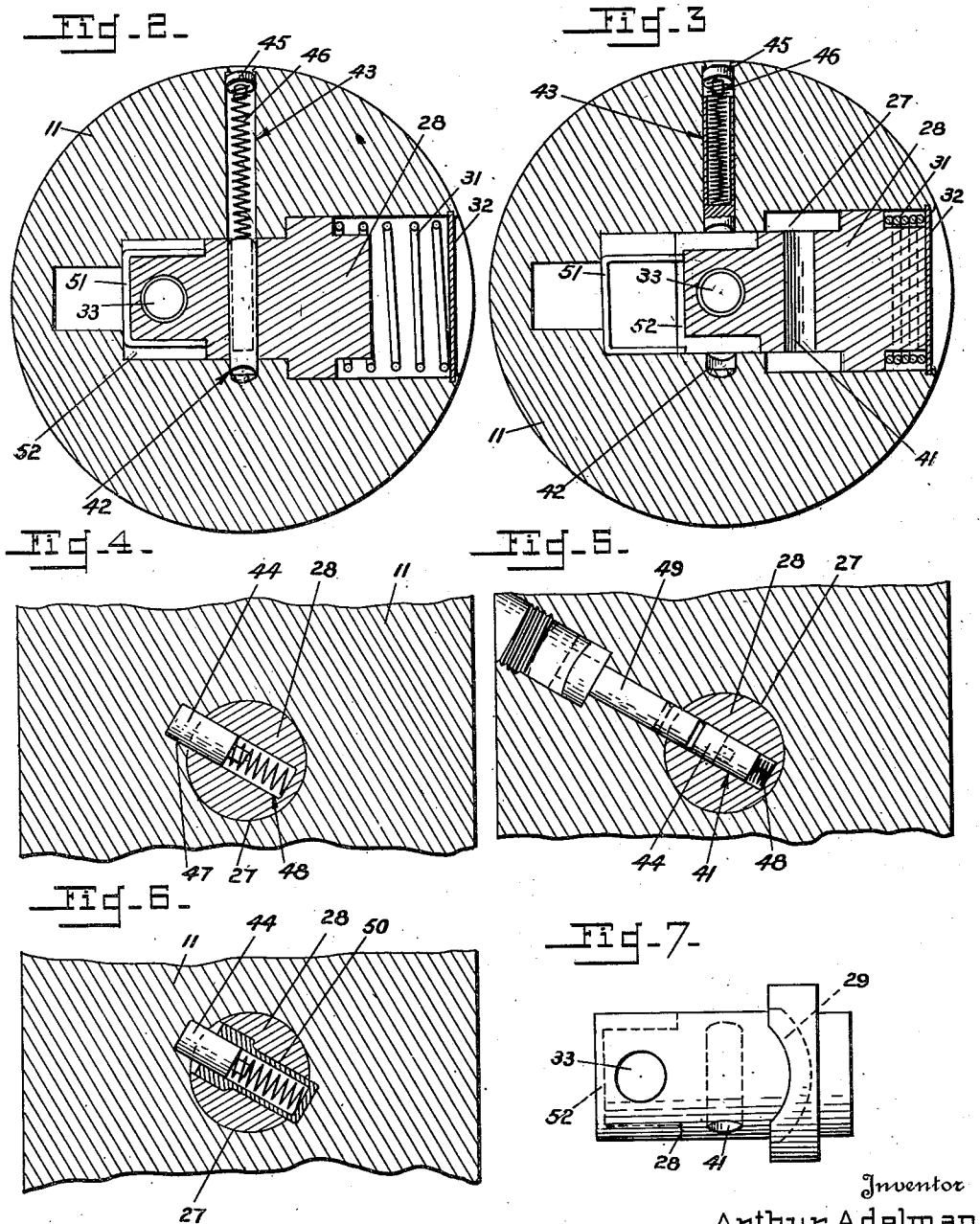
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Inventor
Arthur Adelman

By

W. N. Roach

Attorney

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UNITED STATES PATENT OFFICE.

ARTHUR ADELMAN, OF CHESANING, MICHIGAN.

BORE SAFETY DEVICE FOR FUSES.

Application filed February 20, 1925. Serial No. 10,564.

(GRANTED UNDER THE ACT OF MARCH 3, 1883, AS AMENDED APRIL 30, 1928; 370 O. G. 757.)

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.

5 The subject of this invention is a bore safety device for fuses.

This invention relates particularly to bore safety devices in which a member slidable transversely of the fuse body is released to
10 armed position during the rotational flight of a projectile. Considerable difficulty has been encountered in devices of this type in that the safety pins which retain the slidable member in unarmed position are not disengaged there-
15 from until full rotation of the projectile is attained, at which time, the slidable member is tending to arm thereby introducing a binding action between the parts.

To eliminate this binding action, I provide
20 a safety pin, several types being shown, in which the force of setback on acceleration may initiate the withdrawal of the pin to inoperative position so that arming may be completed during rotation, or, set back may be
25 completely cause withdrawal of the pin which is then maintained in this position by centrifugal force due to rotation of the projectile.

The safety pin has its center of gravity so placed that rotation alone tends to lock it more
30 firmly but on setback the center of gravity of the pin is shifted to the opposite side of the axis of the projectile to permit withdrawal of the pin to inoperative position.

Another important object of this invention
35 is to interlock the slidable member and the plunger, the plunger being released as the slidable member is moved to armed position. This eliminates the necessity of providing a centrifugal pin or other arming device for
40 the plunger and also eliminates the difficulty which has been encountered due to the pins returning to locking position during flight.

To prevent the slidable member from arming while in the bore of the gun, it is placed
45 at an angle to the fuse body although the same result may be accomplished by providing an auxiliary safety pin when it is desired to dispose the slidable member perpendicular to the axis of the projectile.

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

55 A practical embodiment of the invention is

illustrated in the accompanying drawings, in which,

Fig. 1 is a longitudinal sectional view of a fuse constructed in accordance with the invention;

Fig. 2 is an inclined transverse sectional view taken on a plane containing the longitudinal axes of the bolt and safety pin and showing them in unarmed position;

Fig. 3 is a similar view showing the pin and bolt in armed position;

Fig. 4 is a fragmentary longitudinal sectional view taken at right angles to Fig. 1 and showing a modified form of safety pin in the armed position;

Fig. 5 is a similar view of a modification of Fig. 4;

Fig. 6 is a similar view of a modification of the safety pins shown in Fig. 5;

Fig. 7 is a plan view of the bolt;

Fig. 8 is a side elevation of the plunger; and

Fig. 9 is a plan view thereof.

Referring to the drawings by numerals of reference:

My improved safety device is shown as applied to a combination fuse in which a fuse head 10 is threadedly connected to a fuse body 11. The nose of the fuse is bored and tapped to receive a striker casing 12 in which is slidably mounted a striker 13, provided intermediate its ends with a screw threaded portion 14 which threads into an aperture 15 in the casing to retain the striker in inoperative position, if desired. The striker may be releasably held in its forward position by means of a coiled spring 16.

The fuse is formed with a cavity 17 between the head and the body and into this cavity projects a fixed firing pin 18 carried by the fuse head. Within the cavity is a plunger 19 which is formed with a central aperture 20 through which the striker is adapted to pass and a second aperture 21, off center, for the reception of a priming cap 22, and a powder column 23. The offset aperture is in communication with a flash duct 24, which opens at the rear face of the plunger. The plunger is retained on its seat at the rear end of the cavity when armed by a spring 25 which is confined between the plunger and the fuse head 10.

The foregoing elements are but briefly described as they form no part of the present invention.

The plunger is formed with a circumfer-

entail groove 26 adjacent its rear end which is adapted to receive a portion of a slidable member 28 whereby the plunger is held in unarmed position until the slidable member is moved to armed position.

The fuse body is formed with an inclined transverse passage 27, in which is mounted the slidable member consisting of a cylindrical bolt 28, one end of which is formed with a hooked extension 29 adapted to engage in the groove 26 of the plunger. By reason of its inclination the bolt is prevented from arming while in the bore of the gun. The bolt is auxiliarily held in unarmed position against the plunger and a shoulder 30 of the passage by a spring 31 confined between the bolt and the plate 32 which closes the passage. The opposite end of the bolt is formed with an aperture 33 passing entirely therethrough in which is frictionally retained a cup 34 carrying a detonating element 35.

When in armed position the detonator is aligned with apertures 36 and 37 in the fuse body, respectively above and below the passage, the upper aperture adapted to permit passage of the striker or the flash from the primer accordingly as the fuse is set for instantaneous or delay action, and the lower aperture being in communication with a booster chamber 38 which is adapted to receive a metal cup 39 for spacing a booster charge 40 from the bolt.

The bolt is primarily maintained in unarmed position by a locking device which may assume different forms as shown in Figures 2 to 6. In each instance the locking device consists of a pin either carried by the fuse body or the bolt and whose center of gravity is so placed that rotation of the projectile will only tend to lock it more firmly while it can only be moved to release the bolt through the force of setback on acceleration or through this force, plus centrifugal force during rotational flight of the projectile.

As seen in Figures 2 and 3, the bolt is formed with an approximately centrally disposed slot 41 which is normally in register with the short slot 42 on one side and a long slot 43 on the other, both of these slots being in the fuse body. The slots are inclined with respect to the longitudinal axis of the fuse so that on set back, a pin 44 normally disposed in slots 41 and 42 will be moved into the slot 43, the center of gravity of the pin shifting to the opposite sides of the axis of the projectile. Entire withdrawal of the pin from the bolt is completed by centrifugal force during the rotational flight of the projectile.

The slot 43 is closed by a plug 45 against which a spring 46 acts to normally hold the pin in locking engagement with the bolt.

In the modified form shown in Figure 4, the pin 44 is of less length than the diameter of the bolt and is normally projected into a slot 47 in the fuse body by its spring which

abuts the bolt, the slot 48 in the bolt being terminated short of its periphery. On setback, the pin slides into the bolt until its center of gravity is shifted and will be maintained in this position within the bolt through centrifugal force.

Referring to Figure 5, an auxiliary pin 49 is provided to cooperate with the pin 44 shown in Figure 4, and to lock the bolt until acceleration ceases at which time the auxiliary pin is entirely returned to the slot in the fuse body through centrifugal force. A light spring may be used to assist in this return if desired. This construction would enable the bolt to be disposed perpendicular to the longitudinal axis of the fuse instead of at an incline and furthermore, any jolt tending to arm the pin 44 would at the same time jar the auxiliary pin to locking position.

In Figure 6, I have shown both the pin 44 and its hollow auxiliary pin 50 as carried within the bolt, the pins projecting at opposite sides of the bolt into slots formed in the fuse body. On setback the pin 44 will be withdrawn into the bolt while the auxiliary pin 50 will tend to remain in locking engagement with the fuse body. The center of gravity of the pin 44 will be shifted to the right while the center of gravity of the auxiliary pin 50 and also that of the combined pins will still remain to the left. Through centrifugal force, the pin 44 will be held against the closed end of the auxiliary pin while the auxiliary pin and with it the pin 44 moves to the left to be disengaged from its slot in the fuse body until its movement is limited by the wall of the passage 27.

To prevent rotational movement of the bolt as it moves laterally and also to insure retention of the bolt in the armed position, I provide a U-shaped wire 51 loosely disposed in a similarly shaped groove 52 on the bolt, the wire abutting a shoulder 53 in the passage and held thereagainst by centrifugal force when the bolt moves to the right. When the bolt has arrived in the armed position the wire 51 will have sufficient clearance to permit its displacement with respect to at least one element of the groove (Fig. 3) thus preventing the bolt from returning to unarmed position.

While in the foregoing there has been illustrated and described such combination and arrangement of elements as constitute the preferred embodiment of the 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. A fuse including a fuse body, said body formed with a cavity and a transversely inclined passage, a plunger movably mounted within the cavity, said plunger formed with a circumferential groove, a bolt slidably mounted in the passage, a hooked extension

on said bolt for engaging the groove of the plunger, a firing element carried by the bolt, and a centrifugally moving locking member whose center of gravity is shifted on set back, to permit functioning to release the bolt.

2. A fuse including a fuse body, said body formed with a cavity and a transversely inclined passage, a plunger movably mounted within the cavity, said plunger formed with a circumferential groove, a bolt slidably mounted in the passage, a hooked extension on said bolt for engaging the groove of the plunger, a firing element carried by the bolt, and means for releasably holding the bolt and plunger in unarmed position.

3. A fuse including a fuse body, a plunger movable longitudinally of the body, a bolt slidable transversely of the body, a firing element carried by the bolt, and means formed on the bolt for locking the plunger in unarmed position.

4. A fuse including a body, said body formed with an inclined transverse passage, a bolt slidably mounted in the passage, a firing element carried by the bolt, a locking pin normally extending through the bolt on a plane perpendicular to its longitudinal axis and inclined with respect to its horizontal axis, said body formed with slots in register with the pin, means for normally disposing the center of gravity of the pin on one side of the axis of the fuse, and said pin adapted on setback to move radially of the fuse to be disengaged from the bolt through centrifugal force.

5. A fuse including a body, said body formed with an inclined transverse passage, a bolt slidably mounted in the passage, a firing element carried by the bolt, a locking pin carried by the bolt in a plane perpendicular to its longitudinal axis and inclined with respect to its horizontal axis, said body formed with a slot in register with the pin, means for normally projecting the pin in said slot, and said pin adapted on setback to have its center of gravity shifted to the opposite side of the axis of the fuse.

6. A fuse including a body, said body formed with a transverse passage, a bolt slidably mounted in the passage, a firing element carried by the bolt, a plurality of locking pins carried by the bolt, and normally projecting into the body on either side of the bolt, one of said pins adapted to be withdrawn into the bolt on setback, and the other of said pins adapted to be withdrawn into the bolt through centrifugal force, and each of said pins being also adapted to be maintained by centrifugal force in opposite sides of the bolt.

7. A fuse including a body, said body formed with a transverse passage, a bolt slid-

ably mounted in the passage, and a centrifugally movable locking member normally within the bolt and engaging the body, the center of gravity of said locking member adapted to be shifted on setback across the axis of the body to permit functioning of the locking member to release the bolt to armed position.

8. A fuse including a body, said body formed with a transverse passage, a bolt slidably mounted in the passage, a plurality of locking members for locking the bolt in unarmed position, one of said members movable on set-back and the other of said members being movable by centrifugal force from position of rest to ultimately release the bolt to armed position.

9. A fuse including a body, said body formed with a transverse passage, a bolt slidably mounted in the passage, a firing element carried by the bolt, and a centrifugally held U-shaped wire working in a guide in the bolt for preventing rotational movement of the bolt as it moves laterally in the passage, said wire adapted to be clear of the bolt when armed and susceptible of displacement with respect to its guide whereby to prevent return of the bolt.

10. A fuse including a body, said body formed with a transverse passage, a bolt slidably mounted in the passage, a firing element carried by the bolt, and a centrifugally held U-shaped wire working in a guide in the bolt, said wire adapted to be clear of the bolt when armed and susceptible of displacement with respect to its guide whereby to prevent return of the bolt.

11. A fuse including a body, said body formed with a transverse passage, a bolt slidably mounted in the passage, a firing element carried by the bolt, and a centrifugally held U-shaped wire working in a guide in the bolt for preventing rotational movement of the bolt as it moves laterally in the passage.

12. A fuse including a body, a member movable longitudinally of the body and a member movable transversely of the body and throughout its movement intersecting the axis of the longitudinal member, said transverse member adapted to releasably hold the longitudinal member against movement.

13. A fuse including a body, a bolt slidable transversely therein, a pair of telescoping locking members for locking the bolt in unarmed position, one of said members being movable on set-back while the other remains stationary and both of said members movable as a unit under the influence of centrifugal force to ultimately release the bolt to armed position.

ARTHUR ADELMAN