

April 25, 1961

A. J. GRANDY

2,981,192

EXTENSIBLE BORE SAFETY PIN

Filed June 19, 1959

2 Sheets-Sheet 1

FIG. 1.

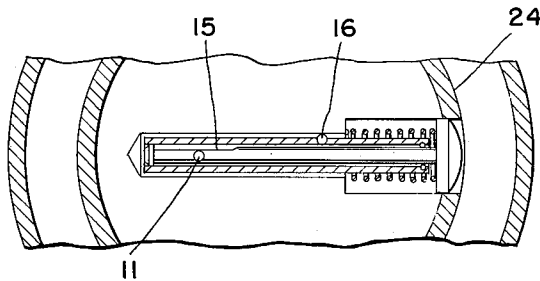


FIG. 2.

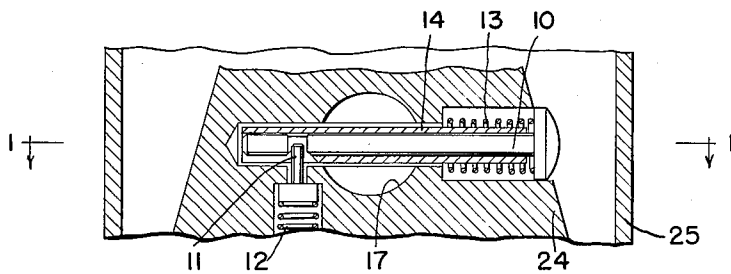


FIG. 3.

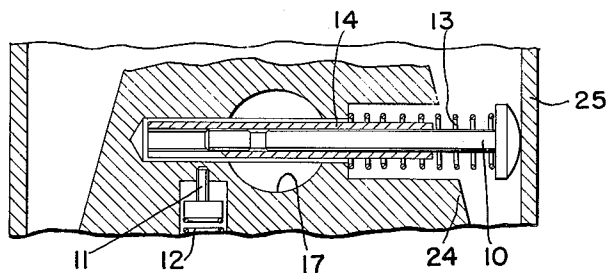


FIG. 4.

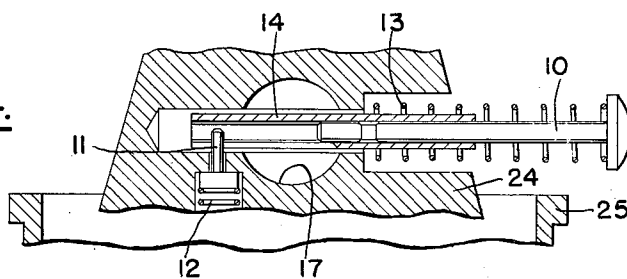
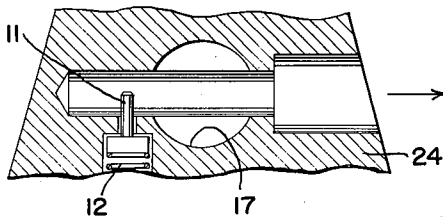
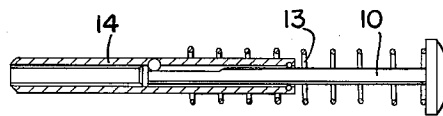


FIG. 5.



INVENTOR.
ANDREW J. GRANDY

BY *S. J. Rotondi*
A. J. Dupont & H. R. Johns
ATTORNEYS:

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A. J. GRANDY

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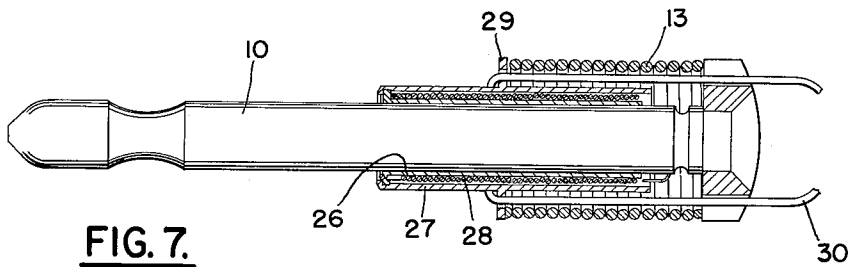


FIG. 7.

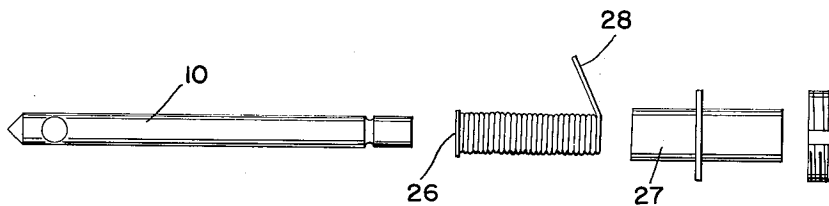


FIG. 8.

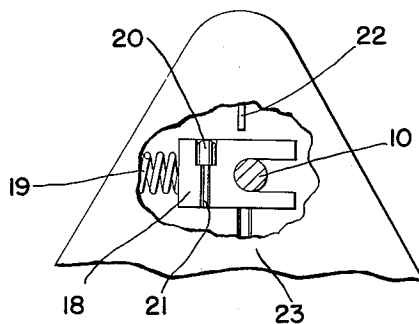


FIG. 6.

INVENTOR.
ANDREW J. GRANDY

BY *S. J. Rotondi*,
A. J. Dupont & A. R. Johns
ATTORNEYS:

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2,981,192

EXTENSIBLE BORE SAFETY PIN

Andrew J. Grandy, North Hills, Pa., assignor to the United States of America as represented by the Secretary of the Army

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3 Claims. (Cl. 102—78)

(Granted under Title 35, U.S. Code (1952), sec. 266)

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.

This invention relates to projectiles and more especially to means for effecting a predetermined time delay between the firing and arming of a projectile.

It has been customary to initiate the arming of a projectile by means of a set-back force which is incident to the firing, i.e. launching from the weapon, of the projectile and is utilized to unlock a bore-safety pin. Movement of this pin a predetermined distance releases a slider which interposes a primer between the charge of the projectile and a firing pin arranged to be actuated upon impact of the projectile with the target. This arrangement has the disadvantage that the time interval between launching and arming of the projectile is limited by the bore-safety pin length that moves past the slider. In accordance with the present invention, any desired time delay between the launching and arming of a projectile is achieved by means of an extensible bore-safety pin.

The invention will be better understood from the following description when considered in connection with the accompanying drawings and its scope is indicated by the appended claims.

Referring to the drawings:

Figs. 1 to 5 illustrate the various positions assumed in the operation of a bore-safety pin or assemblage of the telescopic type,

Fig. 6 illustrates the relation between the bore-safety pin and the slider by which the projectile is armed,

Fig. 7 depicts a bore-safety pin or assemblage of the lanyard type, and

Fig. 8 is an exploded view of the assemblage of Fig. 7.

The bore safety assemblage of Figs. 1 to 5 includes a pin 10 which is recessed near one of its ends to receive a locking pin 11. The pin 11 is biased into the recess of pin 10 by a spring 12 and functioning to hold the pin 10 against a force exerted on its head by a spring 13.

Concentric with the pin 10 is a tube 14 which is slotted near its inner end so that it may move outwardly without interference with the pin 11. As indicated more clearly in Fig. 1, the pin 10 has near its inner end a longitudinal slot 15 which is designed to cooperate with a ball 16 for locking the pin 10 and the tube 14 together when the pin has reached the end of its travels with respect to the tube. Thereafter the pin and tube move together releasing a slider which is mounted in an opening 17.

Fig. 6 shows this slider as viewed longitudinally of the pin 10. It includes a body 18 which is biased against the pin 10 by a spring 19 and bears a primer 20 aligned with an aperture 21. When the pin 10 and tube 14 are withdrawn as previously explained the slider moves to a point where the primer 20 is aligned with a firing pin 22 and the opening 21 is aligned with an opening 23

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through which the charge of the projectile is ignited. The firing pin 22 is a conventional "point impact" type which is activated upon impact with the target. In Figs. 1 to 5 the fuze of the projectile is identified by the numeral 24 and the gun barrel by the numeral 25.

Figs. 1 to 5 depict the different steps involved in the operation of the bore-safety assemblage. Thus Fig. 2 shows this assemblage in its standby position. Fig. 1 is a section taken on the line 1—1 of Fig. 2. Fig. 3 illustrates the situation immediately following set-back with the pin 10 released and contacting the inner surface of the gun barrel. Fig. 4 shows the pin 10 as having cleared the muzzle of the gun and ready to actuate the ball release by which it is locked to the tube 14. Fig. 5 shows the bore-safety assemblage as altogether free of the fuze which is now armed. As can be readily understood, the use of this telescoping assemblage practically doubles the time interval between launching and arming of the projectile.

This interval may be further lengthened by use of the lanyard bore-safety assemblage of Figs. 7 and 8. In this modification of the invention, the pin 10 is encircled by an inner tube 26 and an outer tube 27 between which is a coiled lanyard 28. One end of this lanyard is fixed to the pin 10 and the other end is fixed to the outer tube 27. Between the head of the bolt 10 and a shoulder 29 on the outer tube 27 is the spring 13 which is maintained in its illustrated condition either by a cord 30 or by the insertion of the pin into the fuze as shown in Fig. 2. When so inserted the slider 18 (Fig. 6) engages the outer casing 27 (Fig. 7).

In the operation of the lanyard type bore-safety assemblage, the pin 10 is released by the set-back force and the spring 13 forces its head into engagement with the interior of the gun barrel as previously explained. When the pin 10 reaches the end of the barrel, it is ejected from the inner tube 26 trailing after it the lanyard 28. Complete uncoiling of the lanyard 28 tautens it so that the tube 27 is disengaged from the slider and the projectile fuze is armed as explained in connection with the telescopic bore-safety assemblage of Figs. 1 to 6.

As can be readily understood, the above described bore-safety assemblages have the advantage that (1) they provide a greatly extended time delay between the launching and arming of the projectile, (2) they are not affected by temperature variations or set-back forces, and (3) they are economical to manufacture and install, having an outer configuration exactly the same as the configuration of the bore-safety pin.

I claim:

1. A projectile mechanism for controllably increasing the time interval between the launching and arming of a projectile, said mechanism comprising in combination a bore safety pin transversely mounted within a fuze of the projectile, said fuze having a peripheral cut-away portion intermediate its ends, said safety pin having: a head at an outer end disposed generally outside the peripheral cut-away portion and an abutment at its inner end and a longitudinal slot contacting the abutment and extending outwardly along the safety pin and a recess near its abutment end spaced from said longitudinal slot; said fuze having a bore therein generally parallel with the axis of the fuze, a locking pin partially disposed and axially movable within said bore, a first helical spring seated in said bore and contacting the locking pin to urge said locking pin into said safety pin recess, a tube assembly generally concentrically telescopically mounted about said safety pin, a second helical spring having an outer end contacting the head of the bore safety pin and an inner end contacting an inner

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portion of said peripheral cut-away portion and surrounding a portion of said telescoping tube assembly, said telescoping tube assembly having an opening intermediate its ends, forwardly of said safety pin longitudinal slot and inwardly from said peripheral cut-away portion, a releasable locking ball mounted within said opening, an arming slide within said fuze operable in response to ejection of said bore safety pin and telescoping tube assembly whereby upon the firing of the projectile, said locking pin is caused to be withdrawn from said locking pin recess to permit the outward movement of said safety pin by said first helical spring and said releasable locking ball is caused to engage said safety pin longitudinal slot for contacting the safety pin abutment to lock said outwardly moving safety pin to said telescoping tube assembly.

2. The device of claim 1 further characterized by said telescoping tube assembly having a longitudinal slot disposed immediately forwardly of said locking pin recess in said safety pin and extending completely rearwardly of said telescoping tube assembly, said locking pin recess in said safety pin and said telescoping tube longitudinal slot being aligned to permit unimpeded outward movement of said telescoping tube assembly.

3. A projectile mechanism for controllably increasing the time interval between the firing and arming of a projectile, said mechanism comprising in combination a bore safety pin transversely mounted within a fuze of the projectile, said fuze having a peripheral cut-away portion intermediate its ends, said safety pin having a head at an outer end disposed generally outside the peripheral cut-away portion and a recess adjacent an inner end, said fuze having a bore therein generally parallel with the axis of said fuze, a locking pin partially disposed and

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axially movable within said bore, a first helical spring seated in said bore and contacting said locking pin to urge said locking pin into said safety pin recess, a telescoping tube assembly, said tube assembly comprising an inner tube concentrically mounted about said safety pin intermediate its head and recess, an outer tube concentrically mounted about said inner tube in telescoping relation therewith, spring holding means affixed about said outer tube, a lanyard having a first end and a second end, said lanyard being generally helically wound about said inner tube and enclosed by said outer tube, said lanyard first end being fastened to said safety pin at a point adjacent an outer end of said inner tube and said lanyard second end being fastened to said outer tube at a point adjacent an inner end of said outer tube, a second helical spring disposed about said outer tube between its spring holding means and the safety pin head for urging said safety pin outwardly, an arming slide within said fuze operable in response to ejection of said bore safety pin and outer tube of said telescoping assembly.

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