Aug. 25, 1959 W. W. SMALL 2,900,910

UNSHORTER

Filed Aug. 27, 1943

FIG. 1.

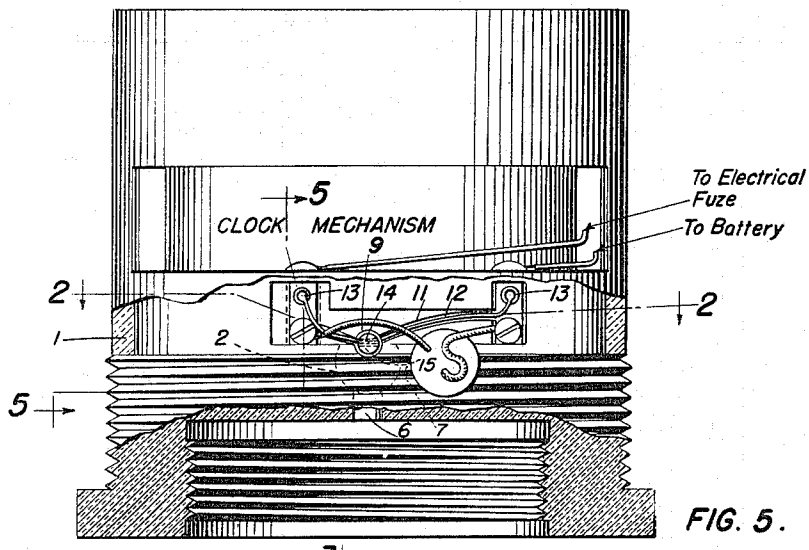


FIG. 5.

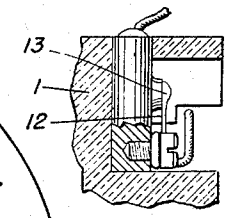


FIG. 2.

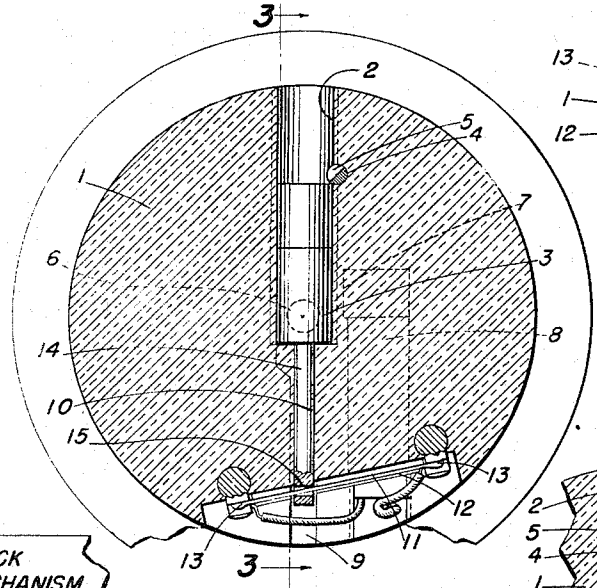


FIG. 4.

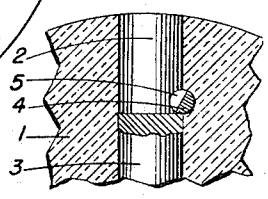
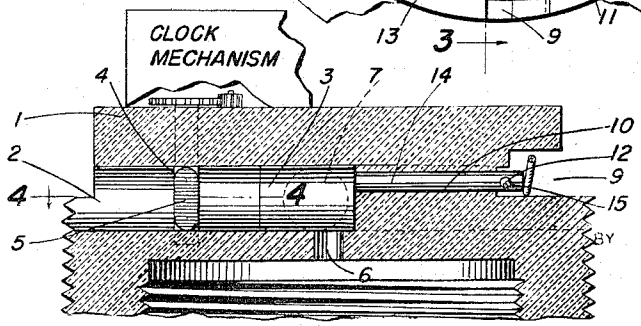


FIG. 3.



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United States Patent Office 2,900,910
Patented Aug. 25, 1959

2,900,910

UNSHORTER

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Application August 27, 1943, Serial No. 500,265

5 Claims. (Cl. 102—70.2)

This invention relates generally to a safety device and more particularly to an improved unshorter for use in electrical fuzes and other types of rotating projectiles.

One of the principal objects of the invention is to provide an unshorter wherein means is employed for breaking the shorting wire, said means being shiftable by centrifugal force.

Another object of the invention is to provide an unshorter wherein the means for breaking the shorting wire is in continuous engagement with said wire and will exert a pulling effort on the wire for shearing said wire.

A still further object of the invention is to provide, in an unshorter, means for normally retaining the gate element employed in a safe position.

Further objects of the invention will appear hereinafter.

In the drawings forming a part of this disclosure:

Figure 1 is a side elevation, partly in section, of the invention,

Figure 2 is a horizontal sectional view taken at 2—2 of Figure 1, showing my improved unshorter,

Figure 3 is a section taken at 3—3 of Figure 2,

Figure 4 is a section taken at 4—4 of Figure 3, and

Figure 5 is a section taken at 5—5 of Figure 1.

Similar reference numerals will be employed to designate like parts throughout the views.

My improved unshorter includes a body 1 which may be formed Lucite or other suitable material. The body 1 is of substantially cylindrical shape and is of such size and diameter that it may be fitted readily into the can of an electrical fuze or similar projectile. Formed in the body 1 is a radial bore or cylinder 2 which accommodates a gate element 3, said gate element being normally held in place by a rotatable detent 4 which is formed with a flattened surface 5. As shown, the detent 4 is normally positioned so that part of its unflattened portion is disposed in the cylinder for holding the gate in its innermost position. In this position, the gate element 3 will block a squib discharge port or opening 6, formed in the body axially thereof, and will also block a frangible wall 7 which is formed at the inner end of a squib receiving chamber 8.

Formed in the body 1, on the same diameter with the cylinder 2, is an opening 9 which communicates with the cylinder 2 through a reduced passage 10. The opening 9 is intersected by a chordally extending or edge groove 11 in a wall surface of the body, through which groove is passed a shorting wire 12, said wire being secured at its opposite ends to terminals 13.

Connected with the inner end of the gate element 3 and adapted for sliding movement in the passage 10 is a shearing element 14 of insulating material, the outer end of said element 14 intersecting the groove 11 and being apertured at 15 to receive the shorting wire 12.

The operation of the invention will now be briefly described. In safe position the gate element will be, as previously pointed out, retained in its innermost position in the cylinder 2 by the detent 4. In this position, the outer end of the element 14 will be positioned in the opening 9 and the shorting wire 12 will extend between the terminals 13 and through the opening 15. When the detent is rotated, by clockwork or other suitable mechanism, for presenting its flattened portion 5 toward the cylinder 2, the gate element will be freed and will be shifted by centrifugal force to clear the frangible wall 7 and the opening 6. At the same time, the shearing element 14 will be pulled in by the gate for shearing the mid portion of the shorting wire against the bottom of the groove 11 and thus breaking the short circuit to the squib which is mounted in the chamber 8. When the squib is fired by the electrical fuze, the explosion thereof will break the frangible wall and pass through the discharge opening 6.

It should be understood that the gate element 3, the shorting wire 12 and the other components of the device will be of such size and weight that proper operation of the device will be assured.

What is claimed is:

1. An unshorter for use in a projectile fuse system having a shorting wire across a squib, comprising a body on which the shorting wire is mounted, a shearing pin having a hole through which the wire passes, said pin being slidable in a bore in the body axially connected with a cylindrical bore radially located with respect to the projectile section, said body having a squib chamber separated from said cylindrical bore by a frangible wall, said cylindrical chamber having a squib discharge opening at the axis of the projectile, and a gate member slidable within said cylindrical bore for blocking said discharge opening and said frangible wall in its inoperative position, said member further being connected to said shearing pin and being responsive to centrifugal force caused by rotation of the projectile to actuate the shearing pin to shear the wire.

2. An unshorter for use in a projectile fuse system having a shorting wire across a squib, comprising a body on which the shorting wire is mounted, a shearing pin having a hole through which the wire passes, said pin being slidable in a bore in the body axially connected with a cylindrical bore radially located with respect to the projectile section, said body having a squib chamber separated from said cylindrical bore by a frangible wall, said cylindrical chamber having a squib discharge opening at the axis of the projectile, a gate member slidable within said cylindrical bore for blocking said discharge opening and said frangible wall in its inoperative position, said member further being connected to said shearing pin and being responsive to centrifugal force caused by rotation of the projectile to actuate the shearing pin to shear the wire, and releasable detent means for holding said gate member in inoperative position.

3. An unshorter for use in a projectile fuse system having a shorting wire across a squib, comprising a body on which the shorting wire is mounted, a shearing pin having a hole through which the wire passes, said pin being slidable in a bore in the body axially connected with a cylindrical bore radially located with respect to the projectile section, said body having a squib chamber separated from said cylindrical bore by a frangible wall, said cylindrical chamber having a squib discharge opening at the axis of the projectile, a gate member slidable within said cylindrical bore for blocking said discharge opening and said frangible wall in its inoperative position, said member further being connected to said shearing pin and being responsive to centrifugal force caused by rotation of the projectile to actuate the shearing pin to shear the wire, releasable detent means for holding said gate member in inoperative position, and clock means for releasing said detent means.

4. In an unshorter for use in an electrically fired fuze

for a rotating type of projectile, said fuze having a squib mounted in an explosive chamber, a frangible wall adjacent said squib, and a discharge opening; in combination, a body, a radial bore in said body, said radial bore being located between said frangible wall and said discharge opening, a gate slidable in said bore so as to interrupt communication between said frangible wall and said discharge opening, a detent for retaining said gate in inoperative position, said gate having a shearing element, a shortening wire located within said body for shortening out said squib, said shortening wire being arranged to pass through said shearing element, and mechanically operated means for releasing said detent to free said gate, whereby said gate, under the influence of centrifugal force, moves to a position to uncover said discharge opening, and, at the same time, actuates said shearing element to shear said unshortening wire so that upon the ignition of said squib in said explosion chamber, the explosion thereof fractures said frangible wall and passes through said discharge opening.

5. In an unshorter for use in an electrical detonating fuze for a rotating type projectile, said fuze having a squib mounted in an explosive chamber, a frangible wall adjacent said squib, and an axial discharge port; in combination, a body, a radial bore in said body, said radial bore being located between said frangible wall and said discharge port and communicating with the latter, a gate slidable in said bore so as to interrupt communication between said frangible wall and said discharge port, said

gate initially closing said port, reinforcing said frangible wall, and operable under the influence of centrifugal force to open said port, a detent for retaining said gate in inoperative position, said gate having a shearing element, a groove in said body extending across said bore, a shortening wire located within said groove for shortening out said squib, terminals at each end of said groove for receiving said shortening wire, said shortening wire being arranged to pass through said shearing element, means for releasing said detent to free said gate, whereby said gate, under the influence of centrifugal force, moves to a position to uncover said discharge port, and, at the same time, actuates said shearing element to shear said unshortening wire so that upon ignition of said squib in said explosion chamber, the explosion thereof fractures said frangible wall and passes through said discharge port.

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