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E. D. FISHER ET AL
BOMB SAFETY WIRE SHEAR DEVICE

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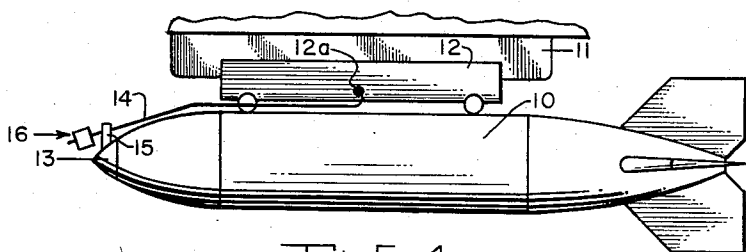


Fig. 1

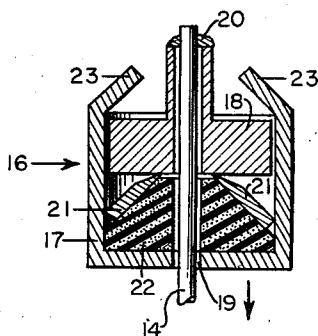


Fig. 2

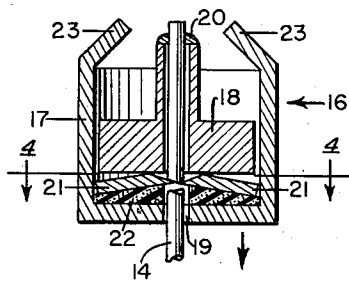


Fig. 3

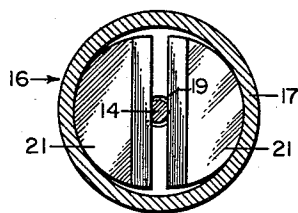


Fig. 4

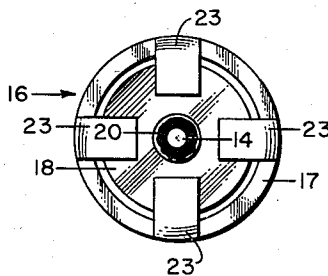


Fig. 5

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BOMB SAFETY WIRE SHEAR DEVICE

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1 Claim. (Cl. 102—2)

(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 us of any royalty thereon.

This invention relates to fuzes for ordnance missiles and more particularly to a device adapted to maintain the missile fuze safety wire in place until the missile is launched.

Previously, the safety wire of a fuze, such as a bomb fuze, was retained in place within the fuze only by friction. Often the friction fails to provide the resistance required to prevent the premature removal of the wire from the fuze, considering the fact that the wire is in the "slip stream" of the airplane and subject to considerable force and "whipping."

Should the safety wire be prematurely removed from the fuze, the fuze would arm almost immediately, creating a serious hazard. The present invention provides a locking action in addition to the one provided by the friction fit.

One object of the invention is a new and novel safety wire retaining and shear device.

Another object is a device adapted to maintain the safety wire within the fuze until the fuze containing missile is launched.

A further object is a device adapted to shear the safety wire when the fuze containing missile is launched.

A still further object is a device which shears the safety wire at a point on the wire and at a time to assure the removal of the wire from the fuze.

One other object is a shear device of inexpensive construction which is simple to install and which is rugged, compact, and reliable.

The specific nature of the invention as well as other objects and advantages thereof will clearly appear from the following description and drawing wherein:

Figure 1 is a diagrammatic view of a bomb and bomb fuze embodying the invention.

Figure 2 is an axial sectional view of the invention in its unfunctioned state.

Figure 3 is an axial sectional view of the invention in the functioned state.

Figure 4 is a cross sectional view of the invention taken on line 4—4 of Fig. 3.

Figure 5 is a plan view of the invention.

Figure 1 shows a bomb 10 releasably attached to the underbelly of an airplane 11 by a bracket 12. The bomb contains a fuze 13, the purpose of which is to function the bomb. Safety wire 14 is threaded through an aperture, not shown, in finger 15 which is a part of and depends from fuze 13. The shear device which is indicated generally by numeral 16, cooperates with safety wire 14 in a manner shown in Figs. 2 through 5. The

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shear device is located on the wire on the remote side of the finger from the bracket, to which the other end of the wire is attached at 12a.

Referring to Fig. 2 shear device 16 comprises a generally cup-shaped tubular housing 17, which has a longitudinal axis. Anvil 18 is mounted for axial sliding in this housing, and wire 14 is coaxial with the housing. Safety wire 14, which is threaded through and slidable within perforation 19 in housing 17 is affixed to anvil 18 by crimping or by bonding such as is indicated by solder joint 20.

A pair of blades 21, 21, Figs. 2 and 3, rest under anvil 18 upon sponge rubber cushion 22, the edges of said blades straddling safety wire 14. Tabs 23, 23, depending from housing 17 are bent inwardly to maintain the several components of the invention within housing 17.

When the bomb shown in Fig. 1 is released from bracket 12 in a manner not germane to this invention and the bomb falls away from the airplane, the safety wire 14 remains affixed to bracket 12 and must be sheared at a point beyond finger 15 if the wire is to be removed from fuze 13 and permit the fuze to arm.

As the bomb moves away from the airplane shear device 16 moves against finger 15, the device attempting to prevent the removal of the wire from the fuze. The result is that a force is exerted on the wire in the direction of the arrow, Figs. 2 and 3.

Referring to Figs. 2 and 3, the force exerted on the wire is transferred to anvil 18 which moves in the direction of the arrow. The blades 21, 21 rest at an angle to the housing axis between anvil 18 and the closed end of housing 17, so that the blades act as toggles when the anvil moves against them and forces the cutting edges of blades 21, 21 to bite into and "nick" wire 14. It is probably unnecessary for the blades to sever the wire. The "nick" will weaken the wire at that point. The force being exerted against wire 14 will "snap" the wire at its weakest point. It is important that that point be beyond finger 15. Otherwise, a portion of the safety wire would remain in the fuze and prevent the fuze from arming.

The purpose of cushion 22 is to normally prevent blades 21, 21 from engaging wire 14 during handling and while the bomb is airborne. Otherwise, there is a likelihood that the safety wire would be prematurely "nicked" and weakened. The "whipping" of the wire in the "air-stream" could, thereafter, cause the wire to sever at its weak point and permit its removal from the fuze. The fuze would then arm and become a hazard. Cushion 22 is compressible and offers little resistance to the blades when they are under the force of anvil 18.

It will be apparent that the embodiment shown is only exemplary and that various modifications can be made in construction and arrangement within the scope of the invention as defined in the appended claim.

We claim:

An improved bomb fuze arming system comprising in combination: a bracket, a bomb releasably attached to the bracket, a fuze on the bomb, a finger on the fuze, a safety wire attached to the bracket and extending through the finger, and safety wire shear means surrounding the wire on the remote side of the finger from the bracket, said safety wire shear means comprising a tubular housing with a closed end and a perforation therein, the closed end of the housing being nearer the finger, an anvil mounted for axial sliding within the housing, the safety

wire from the finger passing through the perforation and being affixed to the anvil, a pair of blades positioned in the housing adjacent the anvil between the anvil and the closed end, the blades being at an angle with the housing axis with cutting edges directed towards the wire, and a cushion in the housing between the closed end and the blades, the cushion normally preventing the blades from engaging the wire, the blades being adapted to engage and bite into the safety wire when the force exerted on the safety wire is sufficient to move the anvil against the blades compressing the cushion, the force exerted on the safety wire being obtained when the release of the

bomb from the bracket causes the closed end of the housing to be drawn against the finger.

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