

[54] **ORDNANCE ARMING ASSEMBLY**
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 [*] Notice: The portion of the term of the patent subsequent to July 18, 1989, has been disclaimed.
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 [58] Field of Search.....**102/76-81.6**

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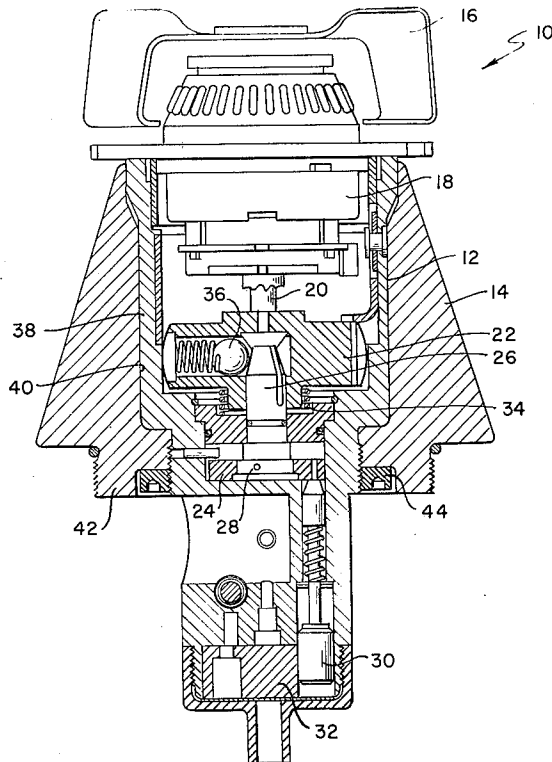
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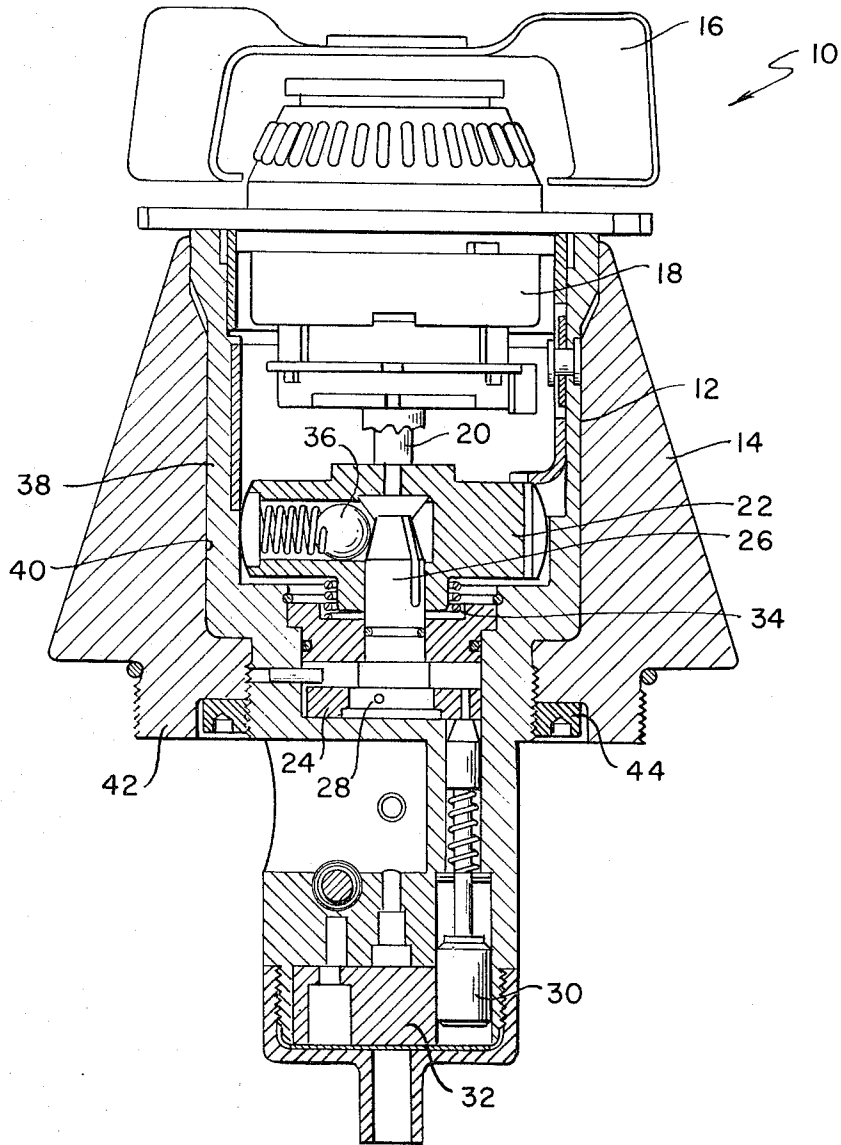
[57] **ABSTRACT**

An arming assembly for an air-delivered ordnance vehicle comprising an arming device which is normally maintained in an unarmed mode capable of becoming armed in response to a predetermined stimulus. A collar member having a tapered configuration is positioned around the arming device to protect the device from any shocks which may cause injury to the explosive elements contained therein. The collar may be formed of 4340 steel hardened to a value of Rc 38.

4 Claims, 1 Drawing Figure

[56] **References Cited**
UNITED STATES PATENTS
 3,677,185 7/1972 Reams 102/78
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ORDNANCE ARMING ASSEMBLY

BACKGROUND OF THE INVENTION

This invention relates generally to a safing and arming assembly for an air-delivered ordnance vehicle, and more particularly to a safing and arming assembly provided with apparatus affording protection against shock due to mishandling and high impact forces upon deployment.

Most air-delivered ordnance vehicles are provided with safing and arming devices enclosed therein for maintaining the ordnance vehicle in a normally safe mode and for arming the vehicle in response to a predetermined stimulus. The safing and arming device may be one of a number of conventional devices which cause the vehicle to become armed in response to the length of travel through the air or the centrifugal force created during flight due to the spin imparted to the projectile. Further, fuze devices have been developed which delay the arming of an aerial ordnance vehicle for a predetermined time after target impact.

All of these devices, however, suffer from a similar problem. Accidental drop of a weapon containing arming devices of the type mentioned hereinabove during handling of the weapon often result in dangerous deformation of the explosive element contained within the arming device. Such accidental deformation often resulted in the weapon containing the arming device to attain an armed configuration thereby giving rise to a dangerous situation to personnel in the immediate vicinity. Another problem arises in the use of weapons including arming devices which are adapted to prevent actuation of the device until after target impact. Oftentimes, the target impact will deform the arming device so as to render the weapon impotent.

SUMMARY OF THE INVENTION

Accordingly, one object of this invention is to provide a new and improved arming assembly for aerial ordnance.

Another object of the invention is the provision of a new and improved arming assembly which is highly resistant to impact shock forces.

Still another object of the present invention is to provide a new and improved attachment for an arming device which will render that device relatively impervious to shock.

Briefly, in accordance with one embodiment of this invention, these and other objects are attained by providing an arming device which is normally positioned in the nose of an air-delivered ordnance vehicle with a collar member having a configuration and formed of a material which will prevent serious deformation of the arming device upon impact.

BRIEF DESCRIPTION OF THE DRAWING

A more complete appreciation of the invention and many of the attendant advantages thereof will be readily appreciated as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawing wherein:

The FIGURE is a side view in section of an arming assembly according to the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawing, an arming assembly 10 is shown as including an arming device generally denoted as 12 and a collar member 14 fixed thereto enclosing a substantial length thereof.

Still referring to the drawing, the arming device enclosed within the collar member 14 may be one of any conventional safing and arming mechanisms employed in air-delivered ordnance vehicles. The arming device 12 illustrated in the preferred embodiment is substantially that disclosed in application Ser. No. 865,707, filed Oct. 13, 1969, now U.S. Pat. No. 3,677,185, by William H. Reams. A brief description of the arming device 12 follows but is to be understood to in no way restrict or limit the invention as claimed by Applicant since any conventional safing and arming device may be adapted according to the present invention. The arming device includes an air vane 16 pivotally mounted so as to rotate during air flight of the weapon. Air vane 16 is connected through various gears 18 and a shaft 20 to striker body 22. Striker body 22 is coupled to a blocking ring 24 by way of a stem 26. Stem 26 is connected to blocking ring 24 by a shear wire 28, the blocking ring normally preventing a spring biased plunger 30 from moving upwardly. A rotor element 32 is thereby maintained in a position whereby an explosive element contained therein is positioned in an out-of-line mode in a firing train. During air flight of the weapon, the air vane 16 rotates causing blocking ring 24 to rotate therewith. Upon a predetermined angular rotation, plunger 30 undergoes a limited upward movement into a pocket formed within the blocking ring (not shown). This same rotation is undergone by striker body 22 which is allowed to move upwardly under the force of spring 34 after predetermined angular rotation. The upward movement of striker body 22 creates a space immediately above stem 26 which is physically filled by a spring-biased ball 36. Upon target impact, stem 26 is pushed downwardly thereby shearing wire 28 and allowing blocking ring 24 to become freely disposed for movement with the plunger 30 under the influence of the spring associated therewith. Upon movement of the plunger, a path is cleared for the rotor element 32 to rotate into an explosive train aligning position and thereby complete the arming cycle of the weapon.

Problems have arisen as mentioned hereinabove with arming devices of the type just described. Due to the inherently precise machining necessary for the element in devices such as arming device 12, when used in prior art weapon assembly, any substantial inadvertent shock which occurs in the normal handling of the weapon containing such arming device might result in dangerous deformation of the explosive element of the arming device. Also, deployment against hard targets at high impact velocity might result in deformation of the arming device sufficient to defeat its function and cause a dud weapon. In order to alleviate these serious problems, a collar member 14 is fitted around a substantially cylindrical housing 38 of the arming device.

The collar member 14 has a substantially frusto-conical configuration including a bore 40 formed axially therein. The taper of the collar member is such as to place the thickest portion of the collar furthest from air vane 16 with the thinnest portion thereof substan-

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tially adjacent thereto. An internal annular lip 42 is formed in the thicker end portion of the collar and abuts a shoulder formed in housing 38. The collar member is maintained in this position by a threaded ring 44 which abuts the other side of annular lip 42 thereby fixing collar member 14 in place.

It has been found that, when the collar member 14 is formed of 4340 steel hardened to a value of about Rockwell C 38, unexpectedly good results are achieved. For example, with collar member 14 in position as shown in the FIGURE, a weapon equipped with arming assembly 10 may be dropped from a 40 foot height, nose down, onto a steel plate backed with concrete without any serious deformation of the explosive element of arming device 12. Such a capability was heretofore thought to be unattainable.

It will be apparent that although the collar member of the present invention is described as formed of 4340 steel hardened to a Rc 38 hardness, any equivalent attained through empirical testing or otherwise is within the scope of the present invention.

Obviously, numerous modifications and variations of the present invention are possible in the light of the above teachings. It is therefore to be understood that, within the scope of the appended claims, the invention may be practiced otherwise than as specifically described therein.

What is claimed as new and desired to be secured by Letters Patent of the United States is:

- 1. An arming assembly for an air-delivered ordnance vehicle comprising:
 - an arming device including a substantially cylindrical housing;
 - a movable arming member having detonating paths

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formed therein and normally positioned in an out-of-line position with respect to an explosive train; a blocking member comprising an elongate plunger normally disposed in a first position restrainingly contacting said arming member in said out-of-line position;

blocking member moving means comprising a rotatable and axially movable blocking ring normally engaging said plunger on its lower surface and maintaining said plunger in said first position,

a rotatable and axially movable striker member coupled to said blocking ring through an elongate stem,

said stem connected at one end to said blocking ring by a shear member, and

means for rotating said striker member,

whereby rotation of said striker member causes said blocking ring to rotate; and

means for substantially insulating said arming device from shock including a collar member having an axial bore formed therethrough, said collar member enclosing said housing in said bore.

2. An arming assembly as recited in claim 1 wherein: said collar has a tapered configuration increasing in thickness along the length of said bore in a linear relationship therewith.

3. An arming assembly as recited in claim 2 wherein: said collar is formed of 4340 steel hardened to a value of about Rc 38.

4. An arming assembly as recited in claim 3 wherein an internal annular lip is formed in the thicker end portion of said collar.

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