

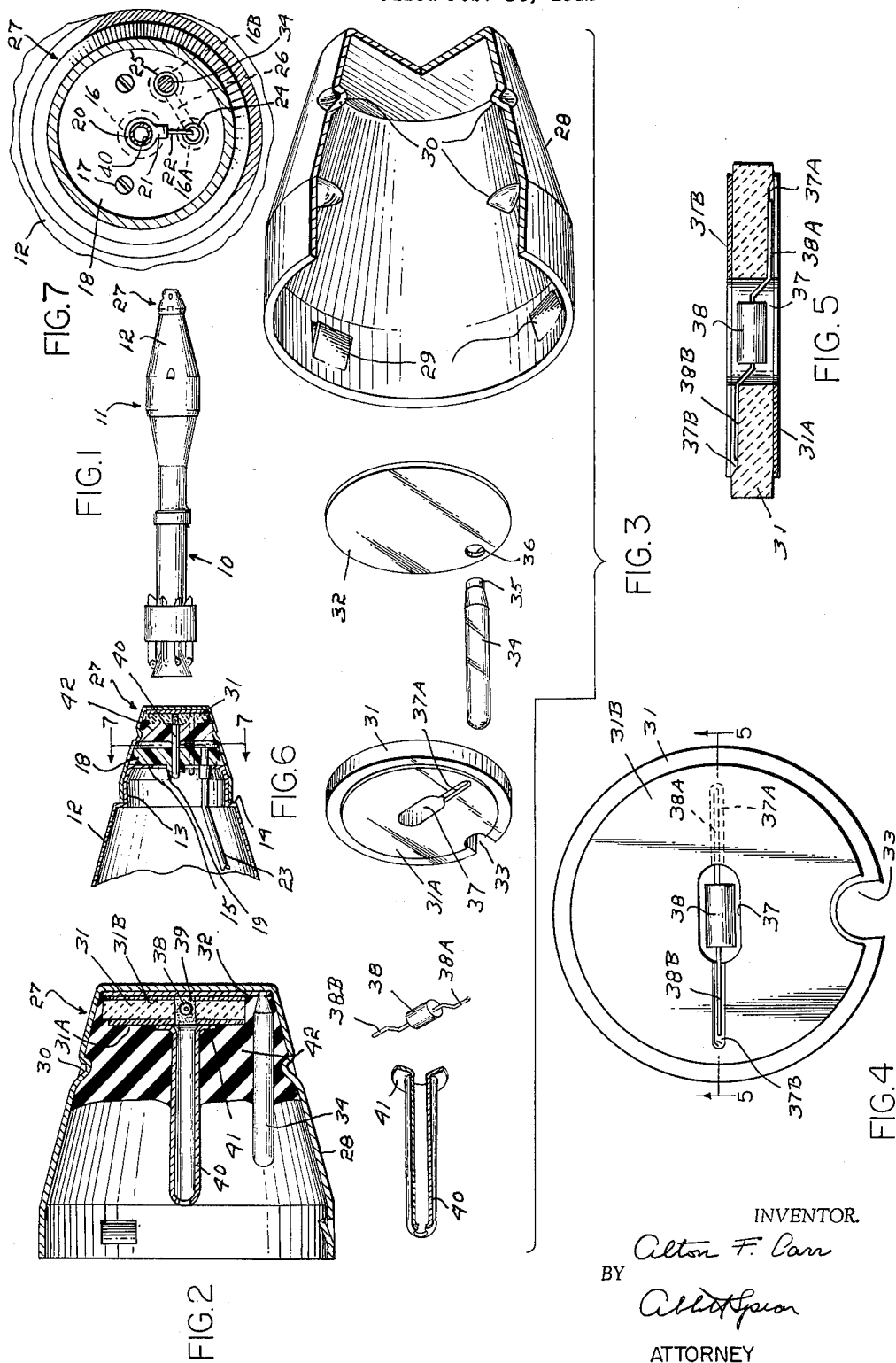
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PIEZO-ELECTRIC FUZE ASSEMBLY WITH BLEED RESISTOR

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PIEZO-ELECTRIC FUZE ASSEMBLY WITH BLEED RESISTOR

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3 Claims. (Cl. 102-70.2)

The present invention relates to nose caps for the war heads of projectiles.

While the invention is adapted for use wherever a war head is to explode in response to an electrical charge resulting from the crushing of a piezo-ceramic disc, it is herein described with particular reference to rockets which well illustrate the problems involved.

In a rocket, the final assembly operation is the attachment of the nose cap and it is essential that the electrical conductors of the war head be properly connected to the piezo-ceramic disc, particularly when one is a lead to the detonator and the other is grounded. It is also highly important to provide the piezo-ceramic disc with a resistor to bleed off extraneous charges that may form thereon. In addition, the features just referred to make for especial structural requirements both as to manufacture and as to use.

The principal objective of the present invention is to enable the above requirements to be satisfied and, in accordance with it, a nose cap is provided for use with a war head having a pair of contacts exposed in its forward end to which end the rearwardly opening cap portion of the nose cap is to be attached. A piezo-ceramic disc is in the front part of the cap portion and its faces are the positive and negative thereof with which positive and ground terminals, respectively, are in electrical contact. A potting compound body, anchored in the cap portion, anchors the disc and terminals in place with the terminals protruding rearwardly of the body for engagement with the contacts.

In the accompanying drawings, there is shown an illustrative embodiment of the invention from which these and other of its objectives, novel features, and advantages will be readily apparent.

In the drawings:

FIGURE 1 is a side elevation of a rocket as illustrative of a projectile having a nose cap in accordance with the invention,

FIGURE 2 is a longitudinal section, on a substantially increased scale, through the nose cap,

FIGURE 3 is an exploded view of certain of the nose cap parts,

FIGURE 4 is a rear end view, on a further increased scale, of the piezo-ceramic body,

FIGURE 5 is a section taken approximately along the indicated lines 5-5 of FIGURE 4,

FIGURE 6 is a longitudinal section, on a reduced scale, of the forward end of a rocket war head with its nose cap attached thereto, and

FIGURE 7 is a section taken approximately along the indicated lines 7-7 of FIGURE 6.

In FIGURE 1, a rocket is generally indicated at 10 and shown as having a generally indicated head 11 which includes an ogive section 12 having a cylindrical nose section 13, forwardly of a shoulder 14, and including an intumed end wall 15 having a central opening 16, see FIGURES 6 and 7, and a pair of spaced eccentric holes, 16A and 16B.

Attached to the front of the end wall 15, as by screws 17, is a body 18 of insulation having a central hub 19 extending through the wall opening 16 and provided with a forwardly flanged sleeve 20 which has a connector

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21 for the insulated lead 22 which extends rearwardly through the hole 16A and through a metal, ground tube 23, to the firing mechanism, which is not shown. The body 18 also has a metal sleeve 24 extending therethrough which receives the end of the tube 23. A sleeve 25 extends through the body 18 in registry with the hole 16B and it is connected to the sleeve 24 by a contact member 26.

The generally indicated nose cap 27, see FIGURES 2 and 3, consists of a cap portion 28 which has, adjacent its rear, open end, a series of circumferentially spaced, intumed tabs 29 which resiliently engage the nose portion 13 of the ogive section 12 and an intermediate series of circumferentially spaced indentations 30.

Housed in the nose cap portion 28 is a disc-shaped, piezo-ceramic body 31, see also FIGURES 4 and 5, whose rear face is its positive and its front face its negative provided with metal coats 31A and 31B, respectively. A metal disc 32 is secured to the face 31B by a conductive adhesive. The body 31 has a marginal recess 33 to accommodate, without contact therewith, the ground terminal 34 whose forward end 35 is dimensioned to enter the hole 36 in the disc 32. A slot 37 traverses the center of the body 31 and terminates in aligned radial channels 37A and 37B. The channel 37A is on the rear face of the body 31 while the channel 37B is on the front face thereof. A resistor 38, anchored in the slot 37 as by potting compound 39, see FIGURE 2, has a lead 38A in the channel 37A and a lead 38B in the channel 37B for the purpose of insuring the bleeding off of such extraneous charges as may develop on the disc 32.

A positive terminal 40, see FIGURES 2 and 3, terminates in a flange 41 which is cemented to the metal coat 31A on the body 31 and it and the terminal 34 protrude rearwardly beyond the body 42 of potting compound which is anchored by the indentations 30 and which anchors the terminals 34 and 40, the body 31 and the disc 32 in place. The terminals 34 and 40 are dimensioned, see FIGURES 6 and 7, to extend into and preferably through the sleeves 25 and 20, respectively, of the insulation body 18 thus to be electrically connected to the grounded conductor 23 and the insulated lead 22.

I claim:

1. A nose cap for the war head of a projectile, the war head having circuitry including a pair of contacts exposed in its forward end, said cap comprising a rearwardly opening cap portion for attachment to the forward end of the war head, a piezo-ceramic disc in the front part of said cap portion, a metal disc secured to the front face of said piezo-ceramic disc and dimensioned to protrude marginally thereof, said piezo-ceramic disc having a central slot effecting communication between the faces of said piezo-ceramic disc, each face having a groove opening into said slot, a resistor within said slot including a pair of leads, each connected to a respective one of said faces and located in the groove thereof, positive and ground terminals in electrical contact, respectively, with the rear face of said piezo-ceramic disc and the exposed margin of said metal disc, and a potting compound body anchored in said cap portion and anchoring said discs and said terminals, the free ends of said terminals protruding parallel with the cap axis rearwardly of said body, each for engagement with an appropriate one of said contacts.

2. A nose cap for the war head of a projectile, the war head having circuitry including a pair of contacts exposed in its forward end, said cap comprising a rearwardly opening cap portion for attachment to the forward end of the war head, a piezo-ceramic disc in the front part of said cap portion, a metal disc secured to

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the front face of said piezo-ceramic disc and dimensioned to protrude marginally thereof, said piezo-ceramic disc having a central slot effecting communication between the faces of said piezo-ceramic disc, a resistor in said slot and including a pair of leads, each connected to a respective one of said faces, positive and ground terminals in electrical contact, respectively, with the rear face of said piezo-ceramic disc and the exposed margin of said metal disc, and a potting compound body parallel to its axis anchored in said cap portion and anchoring said discs and said terminals, the free ends of said terminals protruding rearwardly of said body, each for engagement with an appropriate one of said contacts.

3. A nose cap for the war head of a projectile, the war head having circuitry including a pair of contacts exposed in its forward end, said cap comprising a rearwardly opening cap portion for attachment to the forward end of the war head, a piezo-ceramic disc in the front part of said cap portion, a metal disc secured to the front face of said piezo-ceramic disc and dimensioned to protrude marginally thereof, said piezo-ceramic disc having a central slot effecting communication between

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the faces of said piezo-ceramic disc, a resistor in said slot and including a pair of leads, each connected to a respective one of said faces, positive and ground terminals in electrical contact, respectively, with the rear face of said piezo-ceramic disc and the exposed margin of said metal disc, the positive terminal being axially located with respect to said disc and including a flange dimensioned to straddle said slot, and a potting compound body anchored in said cap portion and anchoring said discs and said terminals, the free ends of said terminals protruding rearwardly of said body parallel to its axis, each for engagement with an appropriate one of said contacts.

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