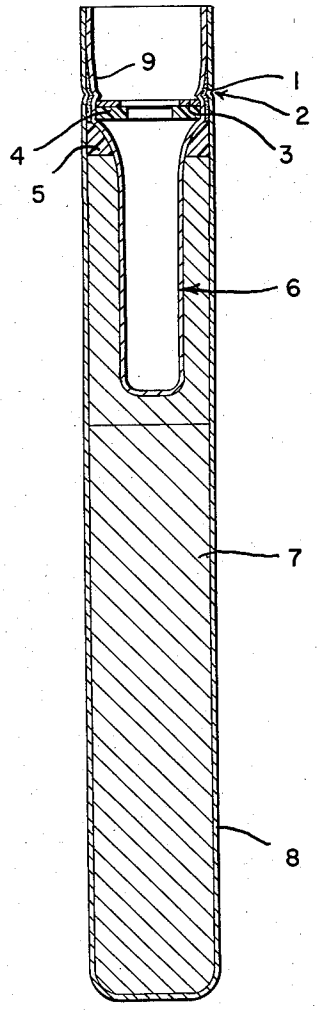
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BLASTING ASSEMBLY

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BLASTING ASSEMBLY

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1 Claim. (Cl. 102—27)

The present invention relates to a novel explosive assembly. More particularly, the present invention relates to an explosive assembly which may be used to detonate relatively insensitive blasting compositions.

In recent years there has been a trend in the blasting arts to use blasting compositions of a rather low order-of-sensitivity in lieu of nitroglycerin or other well-known high explosives. In this connection, numerous blasting compositions containing ammonium nitrate as the principal ingredient have been employed for blasting purposes in large quantities. While blasting compositions of this type are much safer to package and transport than are high explosive nitric esters, they are generally too insensitive to be detonated by conventional initiators, such as blasting caps, and require special detonators.

An object of the present invention is to provide an explosive assembly which will assure the complete and proper detonation of blasting agents of a lower order-of-sensitivity. A further object is the provision of such an assembly which may be reliably operated in a damp environment or under water. Other and additional objects will be apparent from a consideration of the following specifications and claims.

We have found that the foregoing objects may be accomplished by the provision of an explosive assembly having a tapered cap-well for retention of a blasting cap or other initiator, the cap-well being coated with an adhesive substance and pressed into frictional engagement with the inner wall of the assembly container. The nature of the tapered cap-well and the adhesive employed will be more particularly hereinafter described. The attached drawing will serve to illustrate in more detail the novel features of the assembly. The figure is a cross-sectional view of a typical embodiment of the present invention.

In the figure, **8** designates a generally cylindrical shell which may be conveniently formed of commercial bronze, aluminum or other suitable material. The shell contains a charge **7** of a common detonating explosive such as RDX or pentaerythritol tetranitrate, in a suitable amount. A cap-well **6** mounted in a rubber washer **5** is pressed through the open mouth of the container into the explosive **7**. The rubber washer **5** serves to center the cap-well within the container **8** and also functions to scrape the upper inside surface of the container free of any explosive powder as it is inserted.

The upper portion **9** of the cap-well is formed with a gentle downwardly decreasing taper such that the outer diameter of the top section of this portion is slightly larger than the inner diameter of the container and the outer diameter of the bottom section of this portion is slightly smaller than the inner diameter of the container. Prior to its insertion, the outer surface of the upper portion **9** of the tapered cap-well is provided with a thin film of an adhesive substance **1** which ultimately serves to perfect a water-tight seal between the container **8** and the cap-well **6**.

A rubber washer **4** is contained within the cap-well **6**.

The washer has a central opening of a diameter slightly smaller than the outer diameter of a conventional type detonating device, such as a blasting cap. A rigid washer **3**, whose central perforation is greater than that of the rubber washer **4**, is inserted over the washer **4** to retain and support the latter. A number of radial crimps **2** are provided in the cap-well **6** to maintain the washers **3** and **4** in the proper position.

When thus assembled, a commercial detonating means, such as a common blasting cap (not shown), is inserted through the central perforation of the rubber washer **4** and into the cap-well **6**. The rubber washer grips the blasting cap and holds it fast in the cap-well. The entire assembly is then placed in the proper position alongside the primary charge of low sensitivity blasting agent and the assembly may then be detonated by initiation of the blasting cap.

The taper of the upper portion of the cap-well **6** is quite gentle in slope. The outer diameter of the top section of this portion is only a small fraction of an inch larger than the inner diameter of the container and the outer diameter of the bottom section of this portion of the cap-well is only a fraction of an inch smaller than the inner diameter of the container. The outer diameter of the top portion of the cap-well will generally not vary more than a few hundredths of an inch through its entire extent.

The adhesive composition may be applied to portion **9** of the cap-well by any suitable means as, for example, dipping, spraying, brushing, or the like. We use the term adhesive in its broadest, most generic sense and contemplate, as included within this term, a wide variety of sticky or tacky substances such as varnish, gum, asphalt, lacquer, paint, wax, tar, glue, various rubber compounds and organic polymers and the like. Actually any organic or inorganic composition which is sticky or adhesive in nature may be used.

We have found it preferable to permit the adhesive to dry, or partially dry, a few minutes before inserting the cap-well into the container **8**. Due to the close fit of the cap-well in the container, most of the adhesive will collect in the narrow wedge-shaped crevice between upper portion **9** of the cap-well and the container. The friction fit of the cap-well in the container together with the sealing effect of the adhesive composition at this point of contact provides an excellent seal which has effectively resisted penetration of water under high pressure for long periods. This effective water-resistance of the assembly renders it particularly suitable for underwater work for the detonation of a blasting agent packaged in sealed metal cans.

In the embodiment illustrated in the drawing, the resilient washer **4** and the rigid supporting washer **3** are illustrated for retaining a detonator, such as a blasting cap, in initiating relationship with the assembly. Any other suitable retaining means may be used in lieu of that which we have shown for this purpose. The detonator may even be tied to the assembly with a wire or otherwise supported in initiating proximity thereto.

While the invention has been described at length in the foregoing, it will be readily understood that many changes may be made in the details of the assembly and the types of materials used without departing from the scope of the invention. We intend, therefore, to be limited only by the following claim.

We claim:

A water-resistant explosive assembly comprising an elongated container, a charge of an explosive composition partially filling said container, a generally elongated cap-well within said container having a bottom portion embedded in said charge and a gently tapered upper portion

in frictional engagement with the inner surface of said container, the outer diameter of said tapered upper portion prior to its insertion in the container ranging from slightly larger than the inner diameter of the container to slightly smaller than the inner diameter of the container, a thin film of an adhesive substance between the tapered upper portion of the cap-well and said container, and retaining means for an initiator in said cap-well comprising a washer of resilient material, a washer of rigid material superposed over said first-named washer, an internal crimp in the wall of the said cap-well above said washers holding them in position, said washer of resilient material having an outer diameter substantially the same as the inner diameter of the cap-well and having a central perforation whereby an initiator inserted into said cap-well through said central perforation will be firmly gripped by said resilient washer.

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