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ELECTRIC BLASTING CAP

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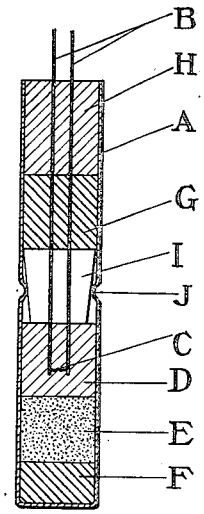


Fig.1

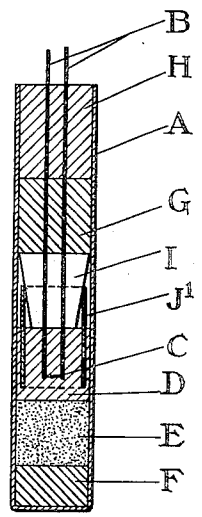


Fig.2

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ELECTRIC BLASTING CAP

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3 Claims. (Cl. 102—10)

Our invention relates to an improved design of electric blasting cap and more particularly to an improved method of waterproofing electric blasting caps by other than chemical means.

Electric blasting caps as commonly manufactured, comprise a metallic shell containing a pressed explosive charge and a firing charge. The ignition of this firing charge is brought about electrically. The electric current enters through leading wires which are connected by a fine bridge wire, which becomes incandescent on passage of the current and thereupon ignites the initial firing charge.

In assembling the elements of electric blasting caps, the leading wires are enclosed in a plug of fusible material which holds them in place, spaced a definite distance from one another. This bridge plug is so dimensioned that it fits into the metal cap shell with only a slight clearance. The plug is usually somewhat tapering in form so that when this bridge plug, with sealed-in wires, is inserted in the shell, the smaller end first, there is more clearance at the lower end of the plug than at the upper.

The bridge plug is positioned in the cap shell so that the bridge wire is embedded in the ignition charge. In order to protect this charge from the effect of water that might pass the bridge plug, because of the existing clearance, a waterproofing composition is customarily poured over the plug after it has been placed in position. Above this waterproofing composition, the usual sulfur seal is placed around the wires for support.

While the above described method for protecting the ignition composition from the effects of moisture has been satisfactory in general, it has had some disadvantages. If the molten waterproofing material, added in liquid form over the bridge plug, is too viscous, it will not properly adhere to the shell wall so as to prevent the entrance of water vapor. On the other hand, if the composition is too fluid, it has a tendency to flow past the bridge plug and onto the ignition composition below. In the latter case, the ignition composition becomes desensitized, with the result that the blasting cap frequently fails to function.

Any method whereby the clearance is mechanically taken up would have a decided advantage in that it would permit the use of waterproofing compositions of a greater degree of fluidity. These adhere more firmly to the shell walls than do more viscous compositions and thereby provide a more certain resistance to water and other liquids. They have the further advantage that at low temperatures, for example, at the temperature of melting ice, they have less tendency to become brittle and cracked, thereby allowing the penetration of water.

The object of our invention is to provide an electric blasting cap of increased water resistance. A further object of our invention is to provide an electric blasting cap in which waterproofing mixtures which are relatively fluid at low temperatures can be employed. Another object of our invention is to provide an electric blasting cap in which a mechanical means is provided to prevent the access of water or other liquid to the ignition charge. Further objects will be apparent as the description proceeds.

These objects are accomplished by the following invention in which we have discovered that a satisfactory degree of water resistance is obtained if the clearance space between the bridge plug and the shell walls is closed by a mechanical means. For example, we find satisfactory results to be obtained when the shell wall has an internal groove or bead, giving a continuous indentation about the wall of the shell. This indentation may preferably occur at about the half-way distance between the top and the bottom of the shell. When the tapering bridge plug is pressed firmly into the cap shell having such a continuous bead, a waterproof junction is formed which gives the desired properties to the electric blasting cap. Similarly we may obtain the desired protection against moisture by the use of a gasket of rubber or other flexible material which may be fitted to the smaller end of the tapering bridge plug. When the plug is pressed into the cap, the gasket makes a tight connection. In the use of such a gasket for obtaining protection against moisture, either the usual tapering form of bridge plug may be used, or, if desired, the narrow end of the plug may be so fashioned that the gasket fits against a collar on the plug. Another method of obtaining the desired results may be to use a cylinder of pyralin or celluloid, or other light-weight material. This cylinder may either be pressed tightly over the narrow end of the tapering bridge plug and the plug then inserted in the cap, or the cylindrical body may be placed in the cap over the ignition composition and the bridge plug then pressed down into it. In either case, the ignition composition is completely protected from the effects of penetrating water or waterproofing composition.

By way of more specific illustration, the ac-

companying drawing shows two forms of our invention. Figure 1 illustrates the embodiment in which the continuous bead or groove about the wall of the cap is used. In this figure, A represents the metal cap shell, B the leading wires, C the bridge wire, D the ignition composition, E a compressed primary charge and F a secondary charge. The tapering bridge plug is represented by I, with the waterproofing charge G above it, and the sulfur plug H. The leading wires B pass through the tapering plug I and are sealed into it, previous to the insertion of the plug in the cap shell. The indentation or internal bead in the cap shell is represented by J, which is continuous around the wall of the shell. When the plug I is pressed firmly into the shell, a tight waterproof joint is formed at J.

Figure 2 similarly represents a form of the invention, in which a cylindrical body of pyralin, celluloid or other material is pressed firmly onto the tapering bridge plug I. The cylinder is represented by J^1. The tight fit between I and J^1 makes it impossible for any moisture to penetrate to the ignition composition D, which is ignited by the bridge wire C.

We have described our invention above in detail. It will be understood, however, that many different embodiments of it may be made without departure from the spirit of the invention, and that we do not intend to be limited except as indicated in the following patent claims.

We claim:

1. An electric blasting cap including in combination a shell, an explosive charge within the shell, a tapering bridge plug into which the leading wires are sealed, fitting into said shell with a slight clearance, and a cylindrical means, one end of which presses down around the ignition charge while the other end fits tightly over the smaller end of the plug.

2. An electric blasting cap including in combination a shell, an explosive charge within the shell, a tapering bridge plug into which the leading wires are sealed, fitting into said shell with a slight clearance, and a flexible means fitting over the plug in such manner as to prevent access of liquids to the ignition charge.

3. An electric blasting cap including in combination a shell, an explosive charge within the shell, a tapering bridge plug into which the leading wires are sealed, fitting into said shell with a slight clearance, said shell having a continuous internal bead around its wall, against which said tapering plug fits sufficiently tight to prevent access of liquids to the ignition charge.

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