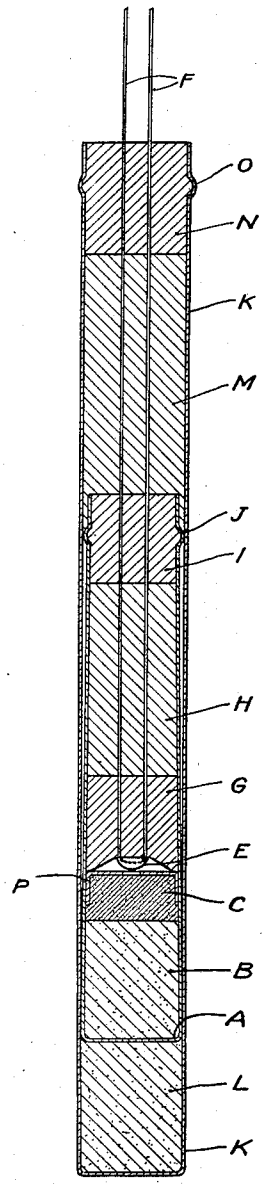
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ELECTRIC BLASTING CAP

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ELECTRIC BLASTING CAP

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This invention relates to blasting caps, particularly electric blasting caps, and the invention has for its principal object improvements in such caps whereby the detonating efficiency is greatly increased as well as the resistance to the penetration of moisture when the caps are used in wet places. Other advantages and features of the improved construction will appear in the following description and accompanying drawing.

In the drawing the figure is a greatly enlarged longitudinal cross section of an electric blasting cap constructed in accordance with my invention.

In the early construction of blasting caps they were comparatively simple in consisting of a cylindrical metal shell, loaded at the closed end with a fulminate or other sensitive detonating explosive and which was set off either by a powder fuse, or by an electric igniter or electric match head.

In recent years the trend in the manufacture of blasting caps has been towards the use of several layers of explosives of varying degrees of detonating quality. The base charge in the cap (principally relied upon to set off the dynamite or other disrupting explosive with which the cap is used) being selected for its detonating efficiency with respect to the main explosive, and it is this type of blasting cap to which the invention more particularly pertains and is shown in the drawing.

In the drawing A represents an inner thin metal shell as of copper alloy as usually used in blasting cap manufacture, which contains within it the complete assemblage of elements required to make an electric blasting cap of the type mentioned. Thus within its closed lower end is a base charge B of a relatively insensitive detonating compound such as tetryl (tetranitromethylanilene), trinitro toluene, nitro mannite, picric acid, or any others, or admixtures, while above this is a more sensitive primary detonating compound C such as mixtures of mercury fulminates, lead azide, chlorate, nitro-mannite and/or other modifying compounds all well known in the art. Above the primary compound may be positioned an electric match-head E made by coating or covering a resistance element with an ignition compound, or a flash compound such as can be readily ignited by the heated resistance element which may project into it, or the primary detonating compound may be in whole or in part so compounded and adapted as to be easily ignited by the electric resistance element which may project into it. The drawing refers to the first mentioned type of construction.

Also shown in the drawing is a centrally perforated inverted capsule P confining the primary detonating compound C, though the use of this is optional insofar as the present invention is concerned.

The electric lead wires F pass upward through a suitable plug G as is customary, then through a sealing compound H which is generally of an asphaltic or other waterproof nature, poured in, in a molten condition, to harden, while on top of the sealing compound H is a closing plug I generally of sulphur poured in while molten so as to interlock into an outwardly formed circumferential groove J in the wall of the shell to prevent any displacement of the layers.

So far described the inner shell A with its contents constitutes an electric blasting cap of well known type of which a number of examples more or less modified are readily obtainable on the market.

Surrounding this inner cap A, however, is an outer metallic shell K, as of thin drawn copper alloy or other blasting cap metals, and with an inner diameter adapted to substantially touch the lower end of the inner shell A as indicated, and the surface of the outer wall of the annular groove J of the inner shell, thus making the outer shell of slightly tapering form, (since groove J is very shallow) and spaced slightly from the inner shell for most of the latter's length. The outer shell may be cylindrical, but the form shown is preferable.

The outer shell extends for a distance below the inner shell and is filled at that point with a base detonating charge L, preferably of the same character as the base charge B carried by the inner shell.

Above the ring J the outer shell K is filled with a sealing compound M preferably of the same character as the sealing compound H in the inner shell, while above the compound M is another closure plug N locked in place by an annular groove O. This plug is preferably of the same composition as plug I.

The quantity of the base charge L confined in the lower end of the outer shell may be greater or smaller than the quantity B within the inner shell depending on the detonating effect required, and may if desired, be a base charge of greater detonating quality than base charge B.

As a modification of the above structure the inner shell A may have its sides straight without the groove J, and when the inner shell is as-

sembled the sealing compound H is poured to a point slightly below the top of the shell, the closure plug I being left out. Then after placing within the outer shell, the sealing compound M is poured directly on the sealing compound H making a continuous column of this material. The upper closure plug N locked in place by the annular groove O will hold the assemblage together.

Blasting caps constructed in the manner shown and described have been found to have greatly increased detonating efficiency, especially in deep hole geophysical prospecting for oil, where great pressures are met with which sometimes cause failure of standard blasting caps. The double seal construction also provides against any possible intrusion of water at great depth and pressures to which caps are subjected in such operations. In fact these improved caps are largely supplanting common caps in such work. They are of course to be embedded in the dynamite, gelatine or other explosive in the usual way.

An important advantage secured by the use of double shell construction is that a very long double sealed and double plugged assemblage is had above the electric match head yet each section of sealing compound (H and M) is poured into a relatively shallow chamber since the inner shell A is completed before inserting into the outer shell K.

Having thus described my improved blasting cap construction what I claim is:

1. A blasting cap comprising a pair of nested tubular blasting cap shells each having a closed lower end and an open upper end and with the bottom wall of the outer shell spaced below the bottom wall of the inner shell, a base detonating charge confined in the lower portion of the inner shell and electric ignition means including a primary charge above said base charge with lead wires extending upwardly and out, means above the ignition means filling and sealing the shell space and sealing around the wires, and a base detonating charge confined in the outer shell space below the inner shell.

2. A blasting cap comprising a pair of nested tubular blasting cap shells each having a closed lower end and an open upper end and with the bottom wall of the outer shell spaced below the bottom wall of the inner shell and the open end of the outer shell extending above the open end of the inner shell, a base detonating charge confined in the lower portion of the inner shell and electric ignition means including a primary charge above said base charge with lead wires extending upwardly and out of both shells, means above the ignition means filling and sealing the shell space and sealing around the wires, and a base detonating charge confined in the outer shell space below the inner shell.

3. A blasting cap comprising a pair of nested tubular blasting cap shells each having a closed lower end and an open upper end and with the bottom wall of the outer shell spaced below the bottom wall of the inner shell and the open end of the outer shell extending above the open end of the inner shell, a base detonating charge confined in the lower portion of the inner shell and electric ignition means including a primary charge above said base charge with lead wires extending upwardly and out of both shells, means above the ignition means filling and sealing the shells and sealing around the wires and a base detonating charge confined in the outer shell space below the inner shell, the filling and sealing means in the inner shell including a waterproof adhesive plastic compound cast in place, and a similar compound cast in place in the outer shell.

4. A blasting cap comprising a pair of nested tubular blasting cap shells each having a closed lower end and an open upper end and with the bottom wall of the outer shell spaced below the bottom wall of the inner shell and the open end of the outer shell extending above the open end of the inner shell, a base detonating charge confined in the lower portion of the inner shell and electric ignition means including a primary charge above said base charge with lead wires extending upwardly and out of both shells, means above the ignition means filling and sealing the shells and sealing around the wires, and a base detonating charge confined in the outer shell space below the inner shell, the filling and sealing means in the inner shell including a waterproof adhesive plastic compound cast in place, and a similar compound cast in place in the outer shell separated by a closure plug positioned in the upper end of the inner shell.

5. A blasting cap comprising a pair of nested tubular blasting cap shells each having a closed lower end and an open upper end and with the bottom wall of the outer shell spaced below the bottom wall of the inner shell and the open end of the outer shell extending above the open end of the inner shell, a base detonating charge confined in the lower portion of the inner shell and electric ignition means including a primary charge above said base charge with lead wires extending upwardly and out of both shells, means above the ignition means filling and sealing the shells and sealing around the wires, and a base detonating charge confined in the outer shell space below the inner shell, the filling and sealing means in the inner shell including a waterproof adhesive plastic compound cast in place, and a similar compound cast in place in the outer shell separated by a closure plug positioned in the upper end of the inner shell, and a closure plug within the outer end of the outer shell.

6. In a double shell blasting cap as set out in claim 2, said outer shell being slightly tapered smaller toward its lower end and embracing snugly the outer wall of the lower end of the inner shell.

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