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PLASTIC PRIMER CARTRIDGE

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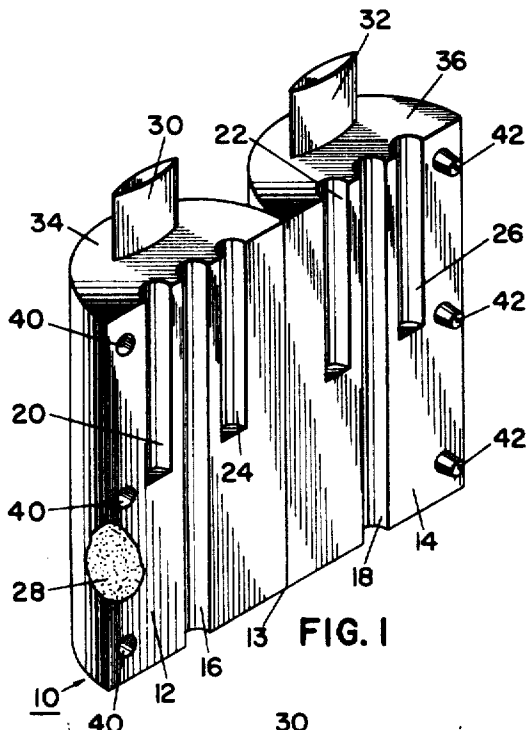


FIG. 1

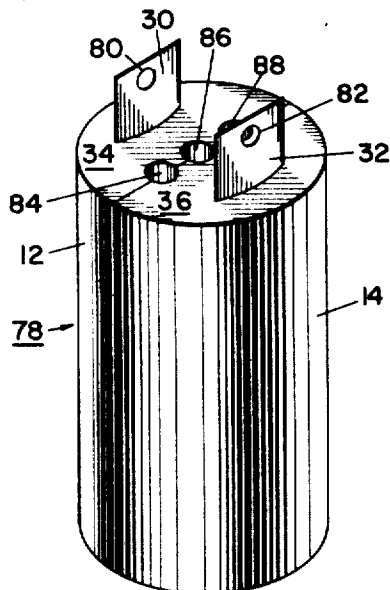


FIG. 3

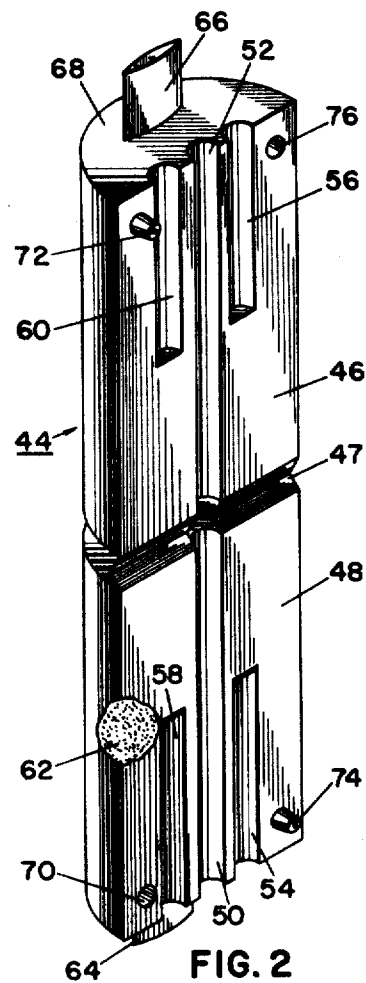


FIG. 2

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PLASTIC PRIMER CARTRIDGE

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1 Claim

ABSTRACT OF THE DISCLOSURE

An explosive, plastic and waterproof primer cartridge is disclosed for use in containing relatively water sensitive explosive charges. The primer cartridge may include a main explosive charge disposed in two elongated hemicylindrical waterproof sections, each of which is provided with a flat or otherwise mating face surface, and face surface joining means disposed on the face surface or holding the elongated sections in face-to-face relationship.

This invention relates to a plastic primer cartridge for containing explosives. More particularly, the present invention relates to a primer cartridge having two elongated hemicylindrical waterproof sections, each of which is provided with a flat or otherwise mating face surface, and face surface joining means disposed on the face surface for holding the elongated sections in face-to-face relationship.

This invention generally provides certain improved features as will be apparent hereinafter over that container disclosed by Nelson in Ser. No. 546,667, filed May 2, 1966, now in U.S. Patent No. 3,354,827.

Primer devices or related assemblies, when used under wet borehole conditions, have been formed by using relatively water resistant explosives such as gelatin dynamite and cast pentolite. Economic considerations, however, favor the use of relatively inexpensive and less water resistant explosives such as, for example, nongelatinous nitroglycerin dynamites, nitrostarch sensitized explosives, nitric acid sensitized slurries, and TNT sensitized explosives. When these relatively inexpensive materials are used, water resistant containers are generally employed to waterproof the charge for effective initiation.

In the prior art, primer charges having little or no water resistance have been generally packaged in metal cans and the detonator element is generally positioned in or against the side wall of the primer can. In the case of using a blasting cap as a detonator, a preformed cap well is sometimes soldered or cemented onto the can to accommodate the cap; whereas, when a detonating cord is used as an initiator, an external tunnel plate is attached to the can to contain the cord. Such assemblies provide for only minimum contact between the detonator element and the main charge in the primer assembly and tend to affect the balance of the primer assembly causing it to bind to the side wall when being slid down a borehole.

In accordance with the present invention, an explosive waterproof primer cartridge is provided which includes two elongated hemicylindrical waterproof sections each having mating face surfaces and containing an explosive charge sealed therein. Each of the mating surfaces is provided with face surface joining means disposed on the face surface for holding the elongated hemicylindrical sections together with contact of the mating surfaces. In one embodiment, the hemicylindrical sections may be provided with a flat or otherwise mating surface having at least one mirror image depression or groove disposed thereon. When this embodiment device is used for containing relatively insensitive explosive charges in a borehole, the mir-

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ror image depressions may be adapted to contain a blasting cap, a detonating cord, a small booster charge either separately or in combination as desired.

The present invention may be more clearly understood by reference to the accompanying drawing wherein like parts are identified by similar reference numbers throughout the several views.

FIG. 1 is a perspective front elevation view illustrating two hemicylindrical sections of the primer of the present invention joined along one side edge;

FIG. 2 is a perspective front elevation view illustrating two hemicylindrical sections of an embodiment cartridge having sections joined along an intermediate section; and

FIG. 3 is a perspective view illustrating an assembly primer of the present invention.

The cartridge of the present invention may be made of any suitable plastic material which may be readily shaped and which is capable of being formed into a waterproof container for holding the explosive main charge. Thermoplastic materials are particularly useful for preparing the present cartridges since they generally possess favorable properties and may be economically blow-molded. Useful thermoplastic materials for preparing the present cartridges include materials such as polyvinyl resin, polyvinyl chloride, polystyrene, polyethylene, polypropylene, and cellulose and acrylic containing thermoplastic resins. Copolymers of these materials along with other materials such as plasticized vinyl chloride-vinyl acetate copolymers are also useful as are related terpolymers exemplified by acrylonitrile-butadiene-styrene terpolymer. Other materials may also prove useful.

Referring to FIG. 1, plastic cartridge 10 is illustrated having left hemicylindrical section 12 joined along edge 13 to right hemicylindrical section 14.

Each face surface of the two elongated hemicylindrical sections 12 and 14 that make up the present cartridge may be provided with suitable mirror image grooves or depressions such as depression 16 on section 12 and its mirror image depression 18 on section 14. When mirror image depression 16 and 18 are joined, they form a channel through the cartridge for supporting, if desired, a detonating cord or the like. Similarly provided are terminated mirror image depressions 20 and 26, and related depressions 24 and 22 for supporting a booster charge or initiating cap or a combination thereof as desired for detonating explosive material 28 confined within each hemicylindrical section. The terminated mirror image depressions may be positioned as illustrated or may be positioned internally on the face surfaces when joined to form the cartridge.

Explosive material 28 may be introduced into the hemicylindrical sections through filling tabs 30 and 32 positioned respectively in section tops 34 and 36.

The explosive material charged into the present cartridge may be any suitable explosive whether water dudable or non-water sensitive. Although little advantage by waterproofing may result for nonwater sensitive explosives, it is recognized that such explosives may be contained in the present cartridge if desired. An example of a blasting composition usefully contained in the present cartridge is a nitric acid sensitized ammonium nitrate slurry.

After the explosive material has been charged into each of the elongated hemicylindrical sections, the filling tabs are sealed by a suitable means such as heat, although other means such as adhesives or crimping may also be used, to effect a water tight seal. The tabs may be perforated to provide means to securing a line for lowering the cylindrical cartridge formed of half sections into a borehole.

The half sections 12 and 14 may be joined by suitable face surface joining means to form the cylindrical cartridge such as by introducing into sockets 40, mating studs

42 which may be held therein by any suitable means such as a force-fit, adhesive or snap-type fit. Further, sockets 40 and mating studs 42 may be positioned in any desired location and may be of any practical number.

FIG. 2 illustrates an embodiment cartridge 44 of the present invention having upper hemicylindrical section 46 joined by hinge 47 to lower hemicylindrical section 48. Disposed on section 48 is groove 50 having corresponding mirror image depression 52 on section 46. Partial or terminated groove 54 is also provided, if desired, having corresponding image depression 56, as is related groove 58 having corresponding image depression 60. Explosive material 62 in hemicylindrical sections 46 and 48 is introduced through filling tabs 64 and 66 respectively. Filling tab 66 is illustrated positioned conveniently on top section 68 of hemicylindrical section 46.

A cartridge may be formed of the hemicylindrical sections simply by folding the sections about hinge 47 and joining the face surfaces at the face surface joining means such as by introducing into socket 70, mating stud 72 and by introducing stud 74 into socket 76. Although the socket-stud units are illustrated alternately on each hemicylindrical section, it is recognized that each hemicylindrical face surface may be provided with either studs or sockets, or it may have randomly disposed face surface joining members as desired.

FIG. 3 illustrates in prospective view an assembled primer corresponding for example, either to that prepared by cartridge 10 or that prepared by the embodiment cartridge of FIG. 2. When the hemicylindrical sections are joined by the face surface joining means, cartridge 78 results having, for example, hemicylindrical section 12 as one-half thereof and hemicylindrical section 14 as a second half thereof. Filling tabs 30 and 32 disposed on top surfaces 34 and 36, respectively, may be perforated with holes 80 and 82 either during or subsequent to sealing the explosive material in the hemicylindrical reactions. Holes 80 and 82 may usefully provide means for attaching a lowering cord to the cartridge for lowering same into a borehole. Detonating cord channel 86 is formed by mirror image depressions, previously described. If desired, blasting cap well 84 and booster channel 88 may also be included.

In operation, after the present primer has been loaded with the explosive charge, generally at the explosive plant, it is shipped to the blasting site where it is to be used.

Prior to the time of use, a suitable detonator such as a blasting cap and/or booster may be placed in appropriate grooves in one of the elongated sections. Then, two sections of the primer are sandwiched together and held in contact by the provided face surface joining means disposed on the face surface of each hemicylindrical section.

A blasting cap suitable for use as a detonator in the present primer cartridge may be any of the commercially available waterproof caps such as a No. 6 or No. 8 blasting cap. A booster suitable for use in combination with the present primer assembly may be any commercially available booster of a suitable size to fit, if desired, in a provided chamber formed of mirror image depressions in the subject primer cartridge. Such a booster is water resistant and is comprised of a solid mass of a suitable booster composition containing an explosive such as PETN or pentolite.

It is understood that the foregoing detailed description is given merely by way of illustration and that many variations may be made therein without departing from this invention.

What is claimed is:

1. A cylindrical explosive primer cartridge which comprises two elongated hemicylindrical waterproof sections integrally joined along an edge, each having a mating surface and containing an explosive charge sealed therein, each said mating surface being provided with a mirror image depression so arranged that when said surfaces are mated a well adapted to contain a blasting cap, detonating cord or booster charge is provided, cooperating face surface joining means comprising studs and mating receptacle, and filling tabs on said sections provided with perforations making such tabs suitable for use as a lowering means.

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