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EXPLOSIVE CARTRIDGE

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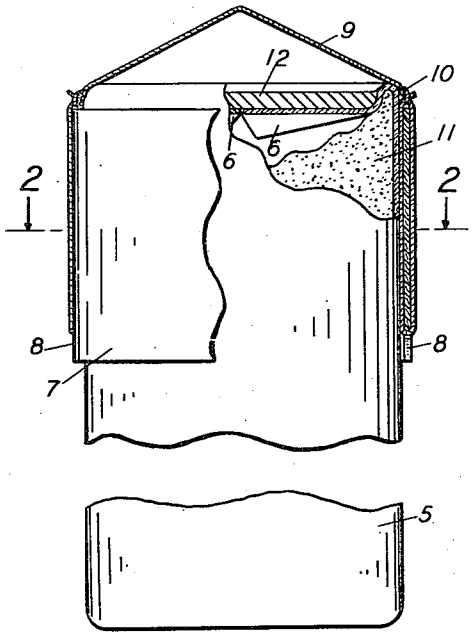


FIG. 1

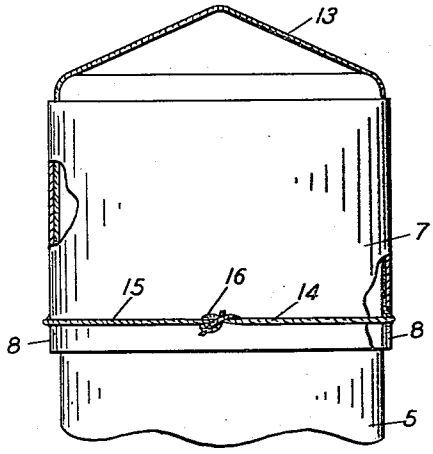


FIG. 3

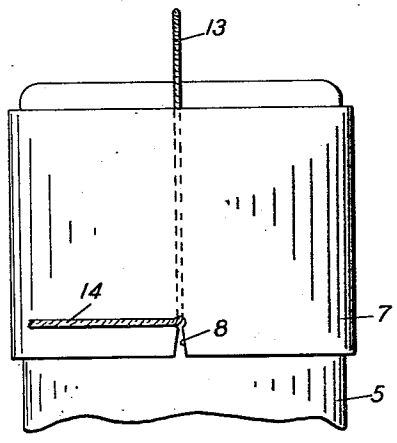


FIG. 4

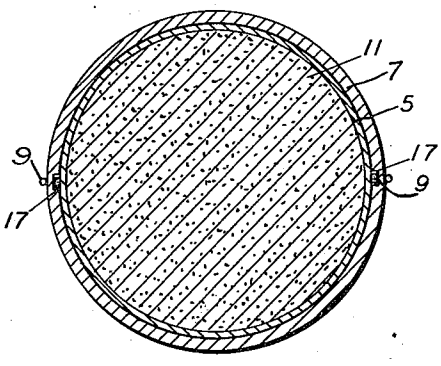


FIG. 2

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EXPLOSIVE CARTRIDGE

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3 Claims. (Cl. 102—24)

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This invention relates to an improved explosive cartridge, particularly to an explosive cartridge having an improved lowering means associated therewith.

Operators working with explosives have always been faced with the problem of loading vertical drill holes with explosive in the safest and most efficient manner. Loading conditions vary with the type of charge to be placed, the condition of the drill hole to be loaded, and the depth of the drill hole. It is most desirable to supply these operators with a ready-packed explosive provided with a lowering means adapted to permit efficient and safe placing of the explosive under all conditions of loading.

The explosives art has attempted to solve the problem by providing each explosive cartridge with a series of cords extending completely around the cartridge and positioned so as to form a supporting net-like structure by which the cartridge may be placed under controlled conditions (see U. S. Patent 1,763,407 to Niesen). Further, the art has suggested the use of a casing provided with a suspension means at the top end and open at the bottom and adapted to be closed by means of a rupturable member (see U. S. Patent No. 1,807,819 to Altgelt). None of these devices solves the problem in the novel and efficient manner herein disclosed.

Therefore, it is an object to provide an explosive cartridge having a lowering means integrally associated therewith and adapted to permit drill hole placement of the explosive in a safe and efficient manner.

Another object is to provide an explosive cartridge lowering means comprising an anchor member secured in fixed position with the cartridge container and a suspension member secured directly to the anchor member in loop relationship therewith.

A further object is to provide an explosive cartridge lowering means having the suspension member secured directly to the anchor member in a half-loop relationship.

A still further object is to provide a method of manufacturing an explosive cartridge comprising an explosive container having one end crimped into closed position, comprising the step of assembling the suspension member with the anchor member in loop relationship therewith and then moving the assembly into fixed position with the container at the closed end thereof.

Still another object is to provide a method of manufacturing an explosive cartridge comprising an explosive container having one end

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crimped into closed position, comprising the step of assembling the suspension member with the anchor member in half-loop relationship therewith and then moving the assembly into fixed position with the container at the closed end thereof.

Generally described, the present invention comprises an explosive cartridge including an explosive container having a band-like anchor means secured to one end and having a suspension member directly secured to the band. The container is formed from a tubular element constructed of paper or other suitable material wound spirally on a mandrel. The band-like anchor means may be formed in the same way and of a diameter sufficient to permit telescopic fit relationship of the anchor means with the container. One end of the tubular element which has been cut to a predetermined length is crimped in a well known manner to form a plurality of fluted sections, each of which extends inwardly toward each other and causes closure at the one end of the tubular element. A suspension member comprising any suitable material as, for example, cord, twine, rope, or wire is looped about the band-like anchor means at diametrically opposite positions. The assembly is then moved into telescopic relationship with the closed end of the container and secured in fixed position by any suitable means, as, for example, glue. The container is then loaded with explosives by inverting the container with the closed end resting on a suitable bottom-like support means. After a predetermined amount of explosive has been packed in the container, the open end is closed in the same manner as hereinbefore described with respect to the first closed end.

Having now indicated in a general way the nature and purpose of this invention, there follows a more detailed description of preferred embodiments thereof with reference to the accompanying drawings in which:

Fig. 1 is an elevational view with parts broken away and partly in section showing the improved explosive cartridge;

Fig. 2 is a view taken in the line 2—2 of Fig. 1;

Fig. 3 is a fragmentary view with parts broken away showing a modified form of the improved explosive cartridge;

Fig. 4 is a view of Fig. 3 turned to the left relative to Fig. 3 through an angle of 90°.

Referring particularly to Fig. 1, numeral 5 indicates the explosive container made of any suitable material as, for example, paper, card-

board, or metal. It is preferred to make the container of a 4-, 5-, or 6-ply 100 pound paper. The container is first constructed from a tubular element which has been made by feeding a predetermined number of plies of paper onto a mandrel in a well known manner. These tubular elements may be made in various size diameters and the tubular elements may then be cut to a predetermined length depending upon the type of explosive cartridge that is to be manufactured. For purposes of describing the present invention, a tubular element of five inches in diameter is placed in a crimping machine and one end thereof crimped to form a closed end. The crimping is done in such a way as to cause the formation of a plurality of flutted sections 6 which operate to close the end of the container and strengthen the closed end against compressive forces which may tend to move the vertical wall section of the container into a collapsed position.

A band-like anchor means 7 made of paper or other suitable materials, in the manner described with respect to the container 5, is of such a diameter as to permit a telescopic fit relationship with the container as shown in Fig. 1. At the lower end of the band-like anchor means is provided a key-like notch 8 diametrically opposite another similar key-like notch, each positioned at the lower edge of the band 7.

A suspension member 9 made of any suitable material as, for example, jute twine, cord, wire, rope, or flat shoe string-like material, is secured to the band in loop relationship therewith by passing one end of the suspension member 9 downwardly the inside of the band through the key-like notch 8 and upwardly on the outside of the band where it is secured by means of a knot 10 at the upper edge of the band immediately above the key-like notch 8. The other end of the suspension member 9 is secured in a similar manner through the remaining notch 8.

The assembly comprising the band 7 and the suspension member 9 is then moved into engaging relationship with the closed end of the container 5 so that the suspension member 9 is disposed in an axial plane of the container 5. The assembly is held in fixed position with the container by any suitable means as, for example, animal glue, which had been previously applied to the inner surface of the band 7 or to the outer surface of the container 5 adjacent the closed end thereof.

The suspension member 9 is of a length sufficient only to permit the free part extending across the closed end of the container to be maintained in a non-twistable position. In this way the cartridge is prevented from twisting as it is lowered into a drill hole by means of a hook or rope (both not shown) looped through the suspension member 9.

After assembly of the band 7 and suspension member 9 with the container 5, the assembled parts are wax coated in any suitable manner and ready in this assembled condition for the explosive plant where an explosive charge 11 is placed through the open end of the container 5. The open end of the container 5 is then crimped to closed position in the manner described with reference to the first closed end. A sealing compound 12 is applied to both ends of the crimped container 5 and the cartridge is then ready for delivery to operators in the field who may safely, efficiently, and positively lower the cartridge into any condition of drill hole. When it is not necessary to seal the cartridge against moisture, the sealing compound 12 may be omitted.

Figs. 3 and 4 show a modified view of the improved explosive cartridge wherein the suspension member 13 is secured to the band-like anchor means 7 by passing the free ends 14 and 15 through the key-like notches 8 and then forwardly about the band 7 in a half-loop relationship therewith and securing the free ends 14 and 15 against movement relative to each other by means of a knot 16.

In order to provide a more positive and complete telescopic fit of the band with the container 5 the suspension members 9 and 13 may be passed down through a groove 17 formed on the inside of the band 7 and extending vertically upward from each key-like notch 8.

From the foregoing description, it is obvious that the objects of this invention have been accomplished by providing an explosive cartridge having an improved lowering means integrally associated therewith and comprising a band-like anchor means fixedly secured to one end of the container and having a suspension member connected directly to the anchor means in a loop or half-loop relationship whereby the explosive cartridge may be lowered in any condition drill hole under full control of the operator.

What I claim and desire to protect by Letters Patent is:

1. In an explosive cartridge, a lowering means comprising a flat relatively wide band fixedly secured in fully received position on said cartridge at one end thereof and having suspension member positioning notches disposed at diametrically opposite positions substantially at the edge of said band away from one end of the cartridge and having a groove extending vertically upward from each notch on the inside of said band, and a suspension member positioned across one end of said cartridge and anchored directly to said band in half-loop relationship through said notches and said grooves and extending partly around said band, said suspension member being of such a length as to prevent that portion of the member positioned across said cartridge end from being moved out of the axial plane of said cartridge when under the influence of a twisting force.

2. In an explosive cartridge, a lowering means comprising a flat relatively wide band fixedly secured in fully received position on said cartridge at one end thereof and having suspension member positioning notches disposed at diametrically opposite positions substantially at the edge of said band away from said one end of the cartridge and having a groove extending vertically upward from each notch on the inside of said band, and a suspension member positioned across one end of said cartridge and anchored directly to said band in loop relationship through said notches and said grooves, said suspension member being of such a length as to prevent that portion of the member positioned across said cartridge end from being moved out of the axial plane of the cartridge when under the influence of a twisting force.

3. In an explosive cartridge, a lowering means comprising a flat relatively wide band fixedly secured in fully received position on said cartridge at one end thereof and having suspension member positioning notches disposed at diametrically opposite positions substantially at the edge of said band away from said one end of the cartridge and having a groove extending vertically

upward from each notch on the inside of said band, and a suspension member positioned across one end of said cartridge and anchored directly to said band, said suspension member passing through said notches and said grooves and being secured upon itself.

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