Feb. 18, 1958 H. J. FRAZER 2,823,610

BLASTING CAP PACKAGES

Filed Jan. 23, 1956

FIG. 1.

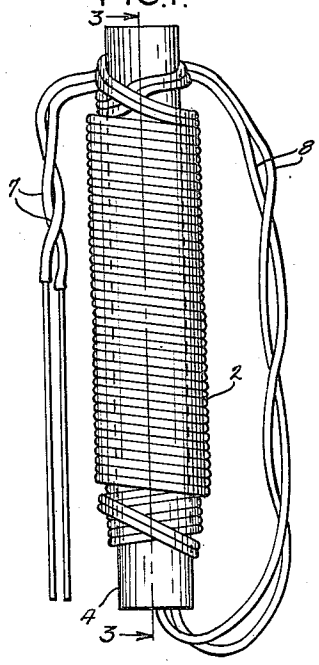


FIG. 2.

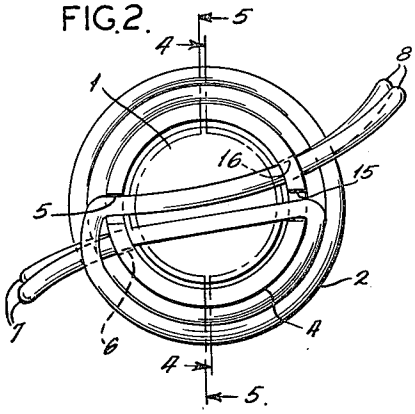


FIG. 3.

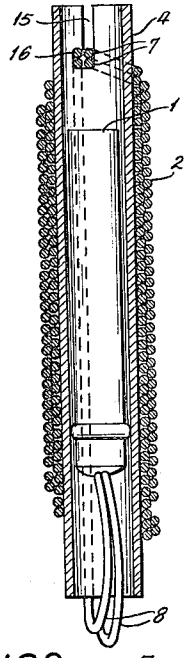


FIG. 6.

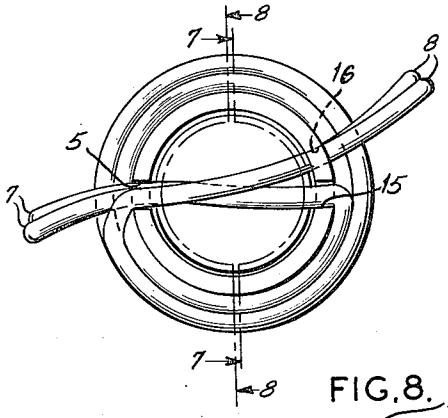


FIG. 4

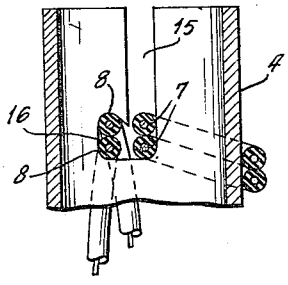


FIG. 9.

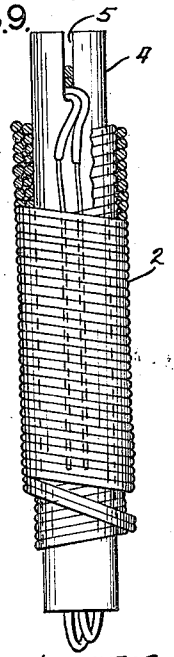


FIG. 8.

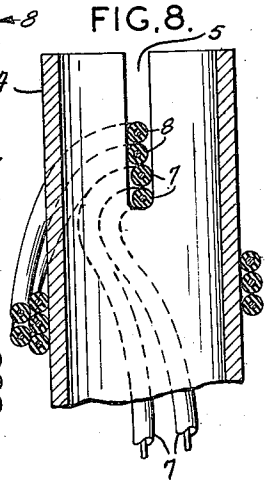


FIG. 7.

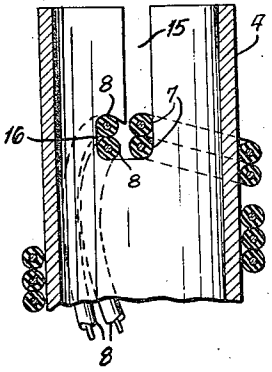
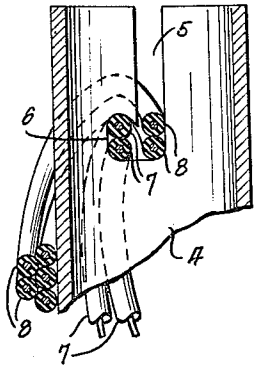


FIG. 5.



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United States Patent Office 2,823,610 Patented Feb. 18, 1958

2,823,610

BLASTING CAP PACKAGES

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Application January 23, 1956, Serial No. 560,506

3 Claims. (Cl. 102—28)

This invention relates generally to a prepared package including electric blasting caps, and particularly to a package wherein the lead wires for the blasting cap constitute a part of the protective enclosure. This application is a continuation-in-part of my prior copending application Serial No. 169,325, filed June 21, 1950, now abandoned.

A blasting cap package of the character to which the present invention relates is disclosed in United States Patent No. 1,698,962. In accordance with that patent, an electric blasting cap having lead wires is packaged so that the body of the cap, which contains a highly explosive and dangerous mixture, is seated within a tube, about the exterior of which the lead wires from the blasting cap are coiled to not only afford protection of the cap, but to provide the lead wires in a condition which will reduce the hazard of handling and placing the cap.

In the patent aforesaid, the ends of the lead wires outwardly of the coil are connected to the tube upon which the wire is coiled by drawing the wire through a slot situated at one end of the tube. While the arrangement disclosed in said patent was used extensively and with eminent success in connection with electric blasting caps having lead wires which were insulated with textile, and which were of relatively soft wire, the bending of which maintained the parts in their desired co-relation, such a package has been found wholly inadequate for use with blasting caps equipped with lead wires which are stiff, springy, or provided with slick insulation of the character represented by plastic-insulated wires now in vogue. With lead wires of the character last mentioned, the package of Patent No. 1,698,962 does not function to retain the wires in position where they will afford the required protection for the cap, or to retain them in such co-relation as to reduce the hazard in handling and application.

It is therefore the object of the present invention to improve upon the package disclosed in the aforesaid patent and to render it adaptable for use with lead wires which are stiff, springy, or slick.

Other objects will become apparent to those skilled in the art when the following description is read in connection with the accompanying drawings, in which:

Figure 1 is a view in side elevation of a prepared package constructed in accordance with the present invention;

Figure 2 is an end view of the package shown in Figure 1;

Figure 3 is a sectional view taken along line 3—3 of Figure 1;

Figure 4 is a sectional view taken along line 4—4 of Figure 2;

Figure 5 is a sectional view taken along line 5—5 of Figure 2;

Figure 6 is an end view corresponding to Figure 2 but showing another embodiment of the invention;

Figure 7 is a sectional view taken along line 7—7 of Figure 6;

Figure 8 is a sectional view taken along line 8—8 of Figure 6; and

Figure 9 is a view in side elevation of a further modification of the invention, part of the coiled wire broken away to reveal the relationship of the parts.

The present invention makes use of the essential features of the prepared package disclosed in Patent No. 1,698,962 in that an electric blasting cap having a shell 1, which contains a charge of high explosive and is provided with a pair of lead wires 2, is packed within a tube 4 of paper, cardboard, or other suitable material. The lead wires are coiled about the exterior of the tube 4 and finally the uncoiled portions at opposite ends of the pair of wires are drawn through a slot 5 at one end of the tube.

The present invention contemplates that at least one, and preferably both, of the slots, through which the uncoiled portions of the lead wires are drawn, be provided with an offset portion of sufficient size to accommodate the cross-section of the pair of lead wires, and that the mouth of the offset portion where it connects with the main portion of the slot be obstructed by a pass of uncoiled portion of the lead wires, so as to retain the wires occupying the offset portion in position therein with sufficient security to prevent their dislodgement under normal handling. The inherent resilience of the material from which the tube is made is, however, sufficient to permit the pair of lead wires to be snapped past the obstructing pass (at the mouth of the offset portion), so as to be emplaced in, or removed from, the offset portion without first removing the pass which obstructs the mouth of the offset.

In the accompanying drawings, the aforesaid slot in the paper tube is J-shaped, having a straight portion 5 and an offset portion 6 remote from the mouth of the straight portion 5 at the end of tube 4. The area of the offset portion 6 is sufficient to accommodate the cross-section of the pair of lead wires, as clearly shown in Figure 4.

In the embodiment illustrated in Figures 1 through 5, the tube 4 is provided with two such slots 5 and 15, arranged diametrically opposite and each having offset portions 6 and 16, respectively, whereas in the embodiment illustrated in Figures 6 through 8, only the slot 15 is provided with an offset portion 16 so that the opposite slot 5 is straight.

Outwardly of the coiled lead wires 2, there is an uncoiled portion 7 beyond the coil, and another uncoiled portion 8 between the coil and the blasting cap 1. The lead wires are naked, i. e., stripped of insulation for some distance along the uncoiled portion 7, while the insulation extends continuously through the coil and to the blasting cap 1 at the opposite end of the wires.

In preparing the package in accordance with the present invention, the lead wires are coiled upon the tube 4 in two layers, the inner of which terminates in uncoiled portion 7, and the outer of which terminates in uncoiled portion 8. The respective layers of the coil are wound about the tube 4 in the embodiment shown so that the inner layer proceeds from uncoiled portion 7 at the slotted end of tube 4 toward the opposite end, while the outer layer proceeds from the unslotted end of tube 4 toward the slotted end, the winding pitch of the wires being reversed at the unslotted end of tube 4. As shown, the uncoiled portion 7 approaches slot 15 from the straight side thereof, while the uncoiled portion 8 approaches slot 5 from the side of offset 6. Accordingly, in preparing the package, the uncoiled portion 7 is drawn through the opposite slots 5 and 15, and seated in the offset 6 of slot 5,

which is the nearest slot (lengthwise of the wires) to the extremity of uncoiled portion 7. Likewise, the uncoiled portion 8 is drawn first through slot 5, entering past the offset 6 where it reposes adjacent the mouth of the offset 6 which already contains the uncoiled portion 7, and thus substantially obstructs the mouth of the offset 6 and prevents accidental dislodgment of the uncoiled portion 7 from said offset. The uncoiled portion 8 is thence drawn through the opposite slot 15, snapped past the uncoiled portion 7 (which already occupies said slot 15 at a position adjacent the mouth of its offset 16), and snapped into position in said offset 16. Thus the respective passes of lead wire in front of the mouths of the respective offsets effectually retain the uncoiled portions 7 and 8 in one of the offsets 6 and 16.

When it is desired to place the blasting cap, the shell 1 is removed from within tube 4 and the uncoiled portion 8 of the lead wires snapped out of the offset 16 which it occupies, and out of the opposite slot 5, thus clearing the mouth of the opposite offset for ready release of the uncoiled portion 7.

In the embodiment shown in Figures 6–8, the structure is precisely the same as described above in connection with the other figures, except that but one of the slots is provided with an offset portion. In the embodiment shown, slot 15 is provided with an offset 16, but slot 5 is not provided with any such offset. In this arrangement, only the outermost of the uncoiled portions is drawn into an offset. For example, if, as shown, the uncoiled portion 8 is drawn into slots 5 and 15 after uncoiled portion 7 has been positioned therein, uncoiled portion 8 will overlie uncoiled portion 7 within slot 5, and thus when uncoiled portion 8 is snapped into offset 16 and retained therein by the part of uncoiled portion 7 which occupies slot 15 adjacent the mouth of offset 16, uncoiled portion 7 cannot be released from slot 5 as long as uncoiled portion 8 reposes in slot 5 between uncoiled portion 7 and the mouth of slot 5. Consequently, uncoiled portion 8 must be released from offset 16 and removed from slot 5 before uncoiled portion 7 is released.

When it is desired to place the blasting cap from the package shown in Figures 6 through 8, the operations are precisely the same as before.

If desired, the uncoiled portion 7 in either embodiment may be disposed adjacent the outer wall of tube 4 before the inner layer of coil is wound thereon, and, in that event, the naked extremities of uncoiled portion 7 are protected from external forces by the coil itself, as shown in Figure 9. This feature of the invention is applicable regardless of whether one or both of the slots is provided with the offset portion, except in those rare cases where, in practice, it is desired to make the electrical connection of the uncoiled portion 7 prior to the placement of the cap.

While in the accompanying drawings, the slot in the tube 4 for accommodation of the lead wires is shown as J-shaped, it will be understood that the slot may assume other forms, as, for example, an L-shape, a T-shape, or a C-shape, so long as an offset portion is provided for the reception of an uncoiled portion, and the offset portion is obstructed by a pass of the other uncoiled portion of the lead wires. In any such case, the lead wires are securely anchored against accidental displacement, yet the inherent resilience of the paperboard tube 4 permits the lead wires seated in the offset portion to be snapped by the pass of lead wire which obstructs its removal.

From the foregoing description, those skilled in the art should readily understand that the invention accomplishes its objects and provides a substantially improved packaged detonator. While one complete embodiment of the invention has been disclosed in detail and modifications indicated, it is not to be understood that the invention is limited to the details of the disclosure, but that such modifications and variations thereof as do not depart from the spirit of the invention are contemplated by and within the scope of the appended claims.

Having thus described the invention, what is claimed and desired to be secured by Letters Patent is:

1. In a prepared package wherein an electric blasting cap is contained within a tube having a pair of diametrically opposite slots at one end, and the lead wires are wound about the exterior of the tube to form a coil with an uncoiled portion at each end of the coil, both uncoiled portions extending from the coil at the slotted end of said tube; the improvement which comprises, said slots each having a straight portion open at the end of the tube and an offset portion connecting with the straight portion at a point remote from the mouth of the straight portion, said offset portions being diametrically opposed and on opposite sides of a plane through the straight portions of said slots, one of the uncoiled portions of lead wires, immediately as it leaves the coil, being disposed within the straight portion of one of the slots athwart the mouth of the offset portion thereof and extending across said tube, and seating within the offset portion of the opposite slot, the uncoiled portion at the opposite end of said lead wires, immediately as it leaves the coil, being disposed within the straight portion of said opposite slot athwart the mouth of the offset portion thereof and extending across said tube, and seating within the offset portion of the first mentioned one of said slots.

2. In a prepared package wherein an electric blasting cap is contained within a tube having a pair of diametrically opposite slots at one end, and the lead wires are wound about the exterior of the tube to form a coil with an uncoiled portion at each end of the coil, both uncoiled portions extending from the coil at the slotted end of said tube; the improvement which comprises, said slots each having a straight portion open at the end of the tube and at least one of said slots having an offset portion connecting with the straight portion at a point remote from the mouth of the straight portion, one of the uncoiled portions of said lead wires, immediately as it leaves the coil, being disposed within the straight portion of one of the said slots athwart the mouth of the offset portion thereof, extending across said tube, and disposed within the opposite slot, the other of said uncoiled portions of said lead wires, immediately as it leaves the coil, being disposed within the straight portion of said opposite slot and across said tube, and seating within the offset portion of the first mentioned one of said slots.

3. The package of claim 2 wherein a part of the uncoiled portion of lead wires which are athwart the mouth of the offset in one of said slots is disposed between said tube and said coil.

References Cited in the file of this patent

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