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PROTECTIVE DEVICE FOR ELECTRIC BLASTING INITIATOR

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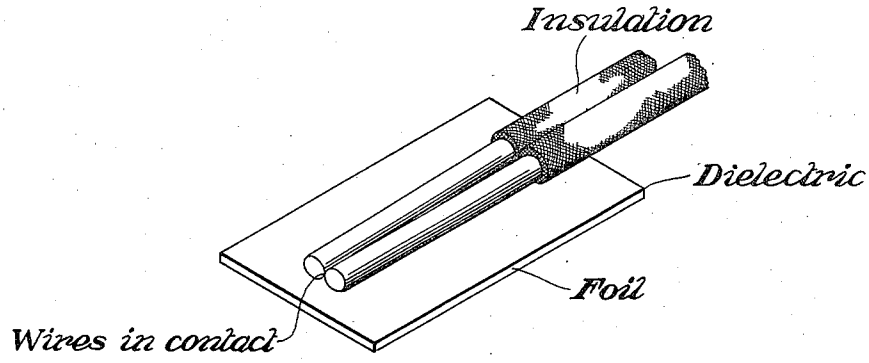


Fig. 1

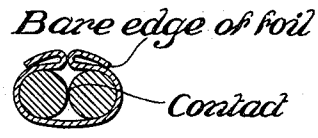
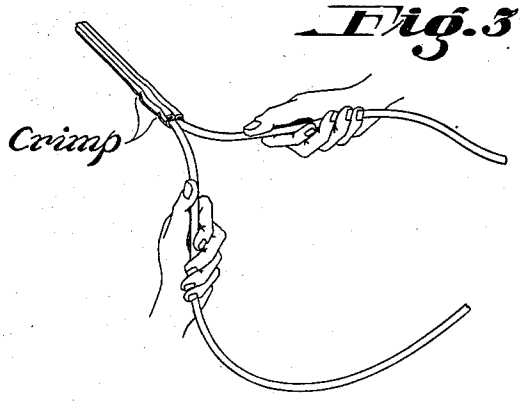


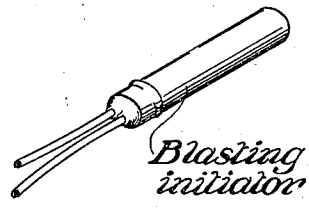
Fig. 4



Fig. 2

Fig. 3





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PROTECTIVE DEVICE FOR ELECTRIC BLASTING INITIATOR

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3 Claims. (Cl. 102—10)

This invention relates to electric blasting initiators and to improved protective means which effectively guard the initiator against inadvertent firing by electrical energy.

This invention is an improvement on the protective device of the earlier patent of one of us, U. S. No. 2,093,275.

As is well known, the leg wires of electric blasting initiators not infrequently come in contact with stray sources of electrical energy which are capable of prematurely firing the cap unless it is adequately protected therefrom. The protective means employed for this purpose should, above all other considerations, be absolutely reliable under all conditions of use. It is highly desirable, also, that the protective means employed should be such that it may be readily attached to the initiator, and easily removable by the user when desired, without deformation of the bare ends or impairment of the electrical connection subsequently made to the blasting machine. The ideal protective means is therefore one which affords effective electrical protection, is easily attached, is easily stripped from the wires by the user when desired, but is not readily damaged or inadvertently removed.

The object of our invention is a protective means having improved features over those heretofore employed. A further object is such a means which offers full protection against certain electrical hazards not fully appreciated heretofore. Other objects will be disclosed in the following description of our invention.

We have found that the foregoing objects may be accomplished by jointly embracing the ends of the insulated leg wires of the initiator with a protective means comprising a metal foil. It is essential to our improvement that the bared end portions of said leg wires be maintained in electrical contact with each other. It is also essential that said foil be coated on at least one surface with a dielectric material. It is further necessary that said coating be provided on the inner surface, that surface in contact with the bared end portions of the leg wires. It is also absolutely necessary that the bared edges of the foil, which are not covered with dielectric material, be kept out of contact with the bared portions of the leg wires.

Our invention may be appreciated more readily from the following description of the preferred embodiment thereof and by reference to the accompanying drawing.

Referring generally to the various figures, Figure 1 is a perspective view of a flat strip of coated foil, with the ends of the leg wires disposed thereon. Figure 2 is a similar view of the coated foil jointly embracing the leg wires in the preferred manner. Figure 3 is a perspective view illustrating the removal of the protective means by the user of the initiator. Figure 4 is a view in cross-section of the coated foil jointly embracing the leg wires in contact.

In greater detail, the foil coated with dielectric is placed with a coated surface in contact with the end portions of the leg wires and extending beyond the ends of the wires at one end of the foil, and beyond the point where the wire insulation begins at the other end of the foil. The bared wire ends are maintained in contact with each other. These features are all brought out by the legends in Figure 1.

In completing the protective means the foil is then compressed and/or crimped about the wires jointly, as shown in Figure 2, completely enclosing the bared end portions of the wires and a part of the insulated portions of the same. It is important to note that the side edges of the foil, which are uncoated, are folded back on the outside so as to be kept out of electrical contact with the bared portion of the wires. This is illustrated further in Figure 4.

This protective means is readily removable at the hands of the user of the electric blasting initiator. As shown in Figure 3, it is conveniently removed by pulling the leg wires apart with the hands.

Perhaps the most important feature of the invention, as demonstrated in the foregoing description of our preferred embodiment, is the folding back of the edges of the foil on the outside of the protective means, so that the exposed edges of said foil, which are free from dielectric covering, are entirely out of contact with the bare wires. The importance of this feature to the user is extremely great as will be brought out later on in the discussion of the advantages of our invention.

The metallic foils contemplated by our invention are preferably those which possess a resistance to tearing not substantially greater than that of pure aluminum foil approximately 0.008 of an inch in thickness, and preferably those having a resistance to deformation or bending stresses, not substantially less than that of pure aluminum foil approximately 0.003 of an inch in thickness. For a given foil, the satisfactory limits of thickness will, of course, depend on the nature of the material itself. Thus, with softer metals, a thicker foil is necessary, whereas for

brittle or stiff foils, a thinner stock may be used.

While foils of various metals may be employed in accordance with our invention, we have found that aluminum, brass and copper foils are particularly satisfactory because of their desirable physical and electrical properties and their ready availability. Other metals may, of course, be substituted for these materials, provided the foils meet the requirements above mentioned.

As to the dielectric covering employed on the surface of the foil, we prefer that either or both surfaces of the foil be covered with a coating comprising regenerated cellulose. Although the foregoing is our preferred embodiment, we may also employ lacquer, shellac, paint, paper or chemical means for forming the dielectric coating on the foil. In fact, an anodically oxidized foil may be employed. Any dielectric may be used so long as the character or amount of the dielectric does not prevent the protector from being torn from the wires by the user.

Our improved protector has many advantages. The outstanding advantage lies in the fact that it offers full protection against electrical hazards not fully appreciated heretofore. Formerly, it was believed that if the bared ends of the initiator wires were shunted together, that the initiator could not be fired electrically, and that the operator was entirely safe until he disconnected the bared ends of the wires. It has now been determined that this belief was erroneous. The initiator can be fired electrically even though the bared ends are twisted together, by applying a source of current to any bared portion of the wire. It has been determined that frequent accidents have occurred as the result of the false security relied upon from the mere fact that the bared ends were connected to each other.

Our improved protective device, according to the present invention, possesses all of the many advantages of the device of U. S. Patent No. 2,093,275, and, in addition, offers protection against these newly appreciated hazards discussed in the foregoing. No matter what may be the source of the stray electrical energy, so long as the bared edges of the foil of our device are maintained on the outside of the device out of contact with the bared wires, the initiator protected with our device cannot be fired inadvertently by electrical means. Our device combines this novel feature with the following advantages: The device is easily attached to the leg wires in the process of manufacturing the initiator and, in fact, may be attached by mechanical means in a mechanical initiator assembly operation, thereby effecting not only a substantial economy but also a great reduction in the number of man hours exposure to danger per million initiators manufactured. Furthermore, it is impossible to remove the protective device unintentionally from the ends of the leg wires. The small size of the protector relative to the diameter of the wire which it is covering, removes the possibility of its being inadventently torn from the wires. This fact coupled with the locking accomplished by any convenient corrugations or crimping about the insulation, makes it impossible to pull the protector longitudinally off the ends of the wires without the use of suitable tools, for example, a pair of pliers.

An additional advantage of our protector is the fact that, although it is not easily damaged or inadvertently removed, it may, nevertheless, be removed by the user when desired by the simple expedient of pulling the wires apart with the hands, as shown in Figure 3. By this simple directed leverage, the protector will become unwrapped from the wires. This is extremely convenient for the user in that it requires no great skill at the blasting operation, and no time is lost as would be the case in the untwisting of twisted wires or similar complicated shunts. In addition, the wires will not be deformed or impaired for the electrical connections subsequently made to the source of blasting current such as the blasting machine or the like.

In the foregoing detailed description of our invention it will be appreciated that many variations may be made without departing from the spirit and scope thereof. We intend therefore to be limited only in accordance with the following patent claims.

We claim:

1. In combination with a blasting initiator for electrical firing and provided with insulated leg wires having uninsulated end portions, a protective means comprising metallic foil jointly embracing said uninsulated end portions, said foil having a dielectric coating on the surface in contact with said uninsulated wires, the bared edges of said foil being folded back on the outside of said protective means out of contact with said bared wires, said wires being maintained in electrical contact with each other within said foil.

2. The combination of claim 1, wherein the protective means comprises aluminum foil.

3. In combination with a blasting initiator for electrical firing and provided with insulated leg wires having uninsulated end portions, a protective means comprising metallic foil jointly embracing said uninsulated end portions, said foil having a dielectric coating on the surface in contact with said uninsulated wires, the bared edges of said foil being folded back on the outside of said protective means out of contact with said bared wires, said foil being crimped in place about the wires in the region of the termination of the insulation thereon, and said wires being maintained in electrical contact with each other within said foil.

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