Nov. 9, 1926. 1,606,419

H. L. GRANT

PROTECTING DEVICE FOR ELECTRIC DETONATORS

Filed Nov. 20, 1925

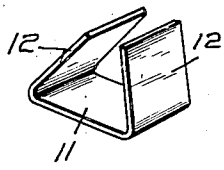


Fig. 1.

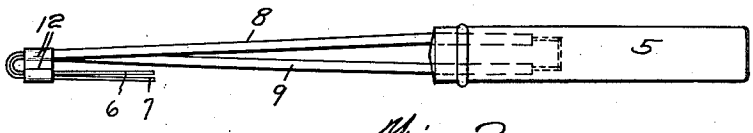


Fig. 2.

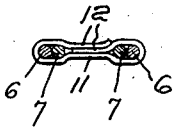


Fig. 3.

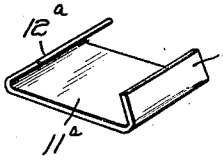


Fig. 4.

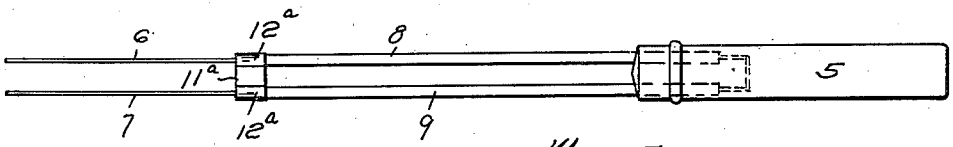


Fig. 5.

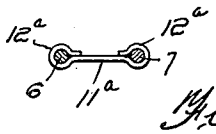


Fig. 6.

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UNITED STATES PATENT OFFICE.

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PROTECTING DEVICE FOR ELECTRIC DETONATORS.

Application filed November 20, 1925. Serial No. 70,370.

This invention relates to a protecting device for electric detonators of the character of that shown in my copending application, Serial No. 748,214, filed on November 6, 1924.

Like the device of the application referred to, the protecting device of the present invention is intended to be applied to the lead-in wires of electric detonators and to serve, while in position, to establish a short circuit between the two lead-in wires, so that any stray currents imposed upon the lead-in wires, outwardly of the point of application of said device, may not find their way to the detonator and prematurely explode the same and so that no difference in potential can be created between the lead wires inwardly of the point of application of the device, under the influence of accidental or stray currents imposed upon said wires, under any conditions.

I am aware of the fact that it has been proposed to short circuit the main firing cable leading from the blasting machine. However, that method is of utility only at the time of use. An important object of the present invention is to provide a structure which will be operative with respect to the individual detonators, at all times between the time of manufacture of the detonator and until the same is actually exploded on the job, the structure being of particular utility during the time that the detonator is being transported and while it is being handled about the work preliminary to the actual connection of its lead wires to the main firing cable.

The present application is directed to the protection of a specific form of short circuiting shunt and method of applying the same to the lead-in wires of the individual blasting caps, preferably with its inner end abutting and resting firmly against the terminal end of the usual insulation of the detonators. In the provision of a structure of this character, which is used only once and then thrown away, it is of importance that it be of a simple and inexpensive nature and one adapted to be applied rapidly by automatic machinery. With this end in view, I have devised the shunt shown in the accompanying drawing wherein:

Fig. 1 is a perspective view of one form of shunt before its application to the lead wires of the detonator,

Fig. 2 is a side elevation of the detonator with the shunt of Fig. 1 applied thereto,

Fig. 3 is a cross sectional view through the shunt of Fig. 2,

Fig. 4 is a perspective view of a slightly modified form of shunt,

Fig. 5 is a side view of a detonator having the shunt of Fig. 4 applied thereto, and

Fig. 6 is a cross sectional view of the shunt of Fig. 5.

Like numerals designate corresponding parts in all of the figures of the drawing.

Referring to the drawing, 5 designates the conventional electric detonator and 6 and 7 designate the usual lead-in wires of said detonator.

In the ordinary use of the detonator the flow of current of sufficient strength past an igniting element 8, which connects the inner ends of the wires 6 and 7, explodes the detonator. The lead-in wires are insulated, as indicated at 9 and 10, for some distance from the detonator and the ends of the lead-in wires are left bare beyond the point where the insulation terminates, to adapt them for ready application to the firing cable, leading from a blasting machine.

In the form of the invention illustrated in Figs. 1, 2 and 3, the shunt consists of a mere strip of metal, such as copper, aluminum, lead, or any other suitable conductive material, and comprises the body portion 11 and bent terminal ends 12.

The lead wires of the detonator are bent upon themselves, as illustrated in Fig. 2 and passed through the shunt or clip of Fig. 1; after which the ends of the clip are folded down upon the body portion thereof, as illustrated in Fig. 3, in such manner as to have firm engagement with and upon the lead wires and preferably with one side of the shunt abutting firmly against the terminal ends of the insulation of the lead wires. This arrangement provides a double safeguard by holding the lead wires of the detonator into contact with each other, at two separate and distinct points. In addition, it directs the terminal ends of the lead wires rearwardly and beneath the insulated portions of the lead wires where they will be more protected from chance contact with stray current carrying objects than would be the case if the ends were left free.

The form of the invention illustrated in

Figs. 4, 5 and 6 is much like that illustrated in Figs. 1, 2 and 3 except that in this case only one of the lead wires is passed through each side of the shunt. The shunt comprises a body portion 11^a and ends 12^a which correspond to the parts 11 and 12, respectively, in Fig. 1. The method of application will be apparent from an inspection of Fig. 6, where it will be seen that the ends 12^a are bent down over the lead wires. At this time, the body portion 11^a forms an electrical connection between the bared portions of the lead wires and the shunt abuts the outer ends of the insulation upon said lead wires. Since the insulation protects the lead wires from the shunt, inwardly, to the detonator and since the shunt itself short circuits any stray currents imposed upon the lead wires, outwardly of its point of application, it is clear that the shunt will act as a protector as long as it is in place. It is not to be understood that the device is of utility only when actually touching the termination of the insulation. It will give a very appreciable measure of protection even when spaced somewhat from the insulation because the influences which might bring about such difference in potential between the lead wires as to explode the detonator, are not those sought to be created by an intelligent human agency but only those which might accidentally occur. Stray currents of such low E. M. F. as to escape ordinary notice constitute a marked source of danger and are rendered absolutely harmless by this invention.

It is to be understood that the invention is not limited to the precise construction set forth but that it includes within its purview whatever changes fairly come within either the terms or the spirit of the appended claims.

Having described my invention, what I claim is:

1. The herein described method of applying a shunt to the lead wires of an electric detonator, which consists of bending the terminal ends of a metallic strip into engagement with said lead wires, with the metallic strip positioned directly against the terminal ends of the insulation of the lead wires.

2. The herein described method of applying a shunt to the lead wires of an electric detonator, which consists of bending one end of a metallic strip over both of the lead wires and bending the other end of said strip over both of said lead wires at another point, said lead wires being given a return bend between said points and the shunt being positioned directly against the terminal ends of the insulation upon said lead wires.

3. The combination with an electric detonator and its lead wires, said lead wires being bare for a portion of their length at their outer ends and being insulated for the remainder of their length, inwardly to the detonator, of a shunt consisting of a metallic strip positioned close enough to the terminal ends of the insulation to practically prevent the creation of a difference of potential between said wires under the influence of accidentally imposed or stray currents and having its opposite ends bent into engagement with said lead wires.

4. A structure as recited in claim 3, wherein both of the lead wires pass through each end of the shunt, said wires being given a return bend between their points of passage through the shunt.

In testimony whereof he affixes his signature.

HARRY L. GRANT.