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DETONATOR SAFETY DEVICE

Filed July 12, 1932

Fig. 1.

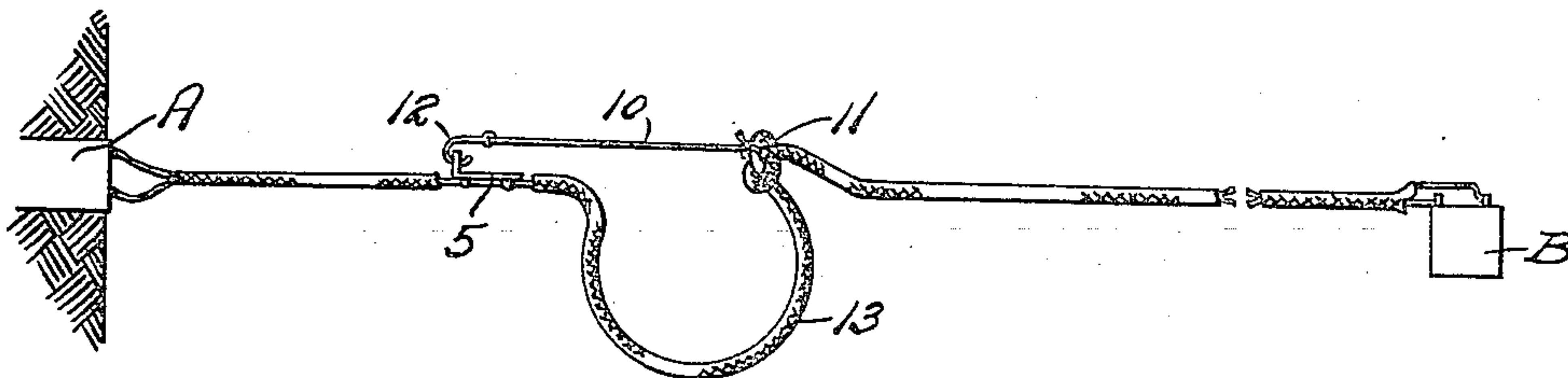


Fig. 2.

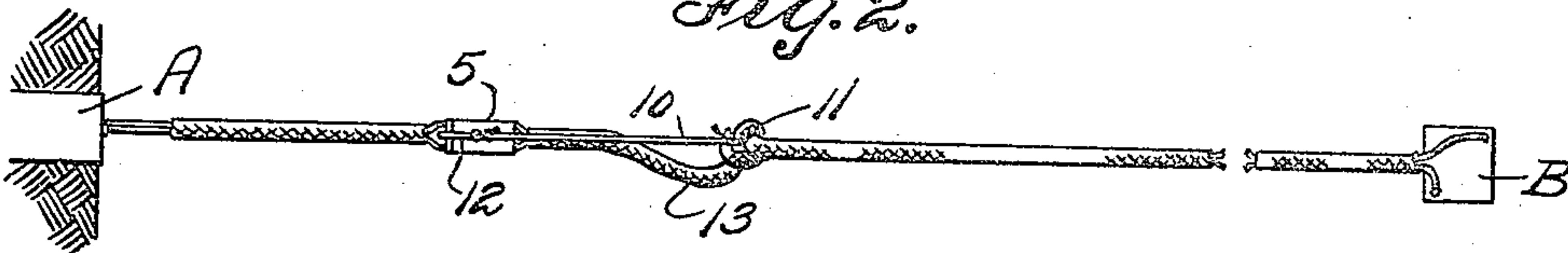


Fig. 3.

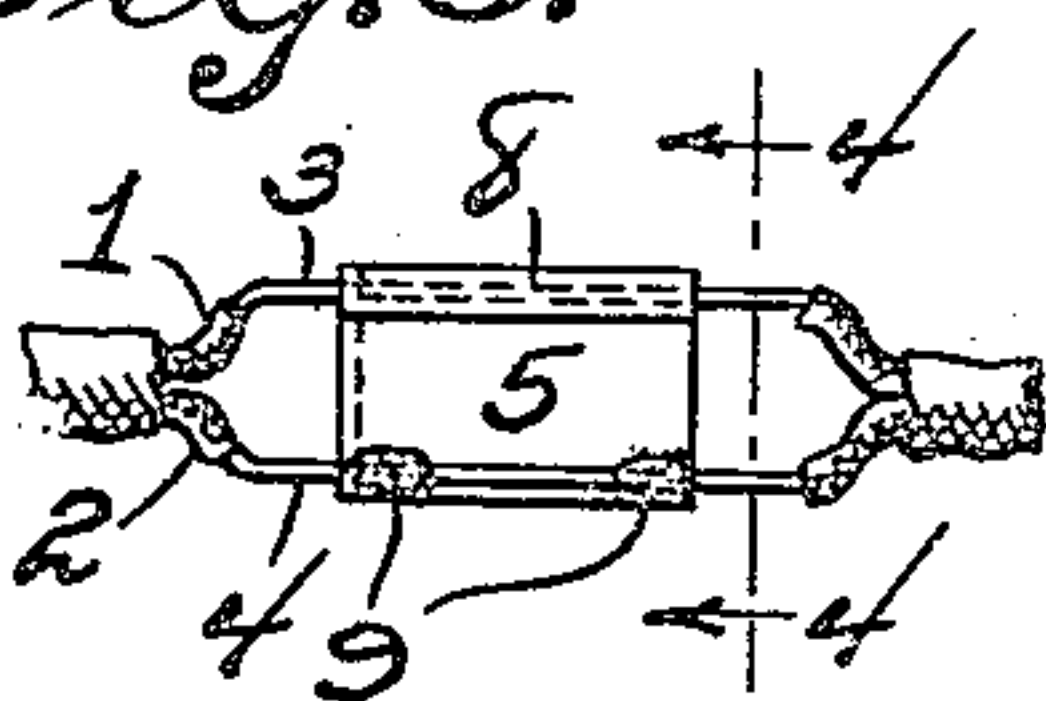


Fig. 4.

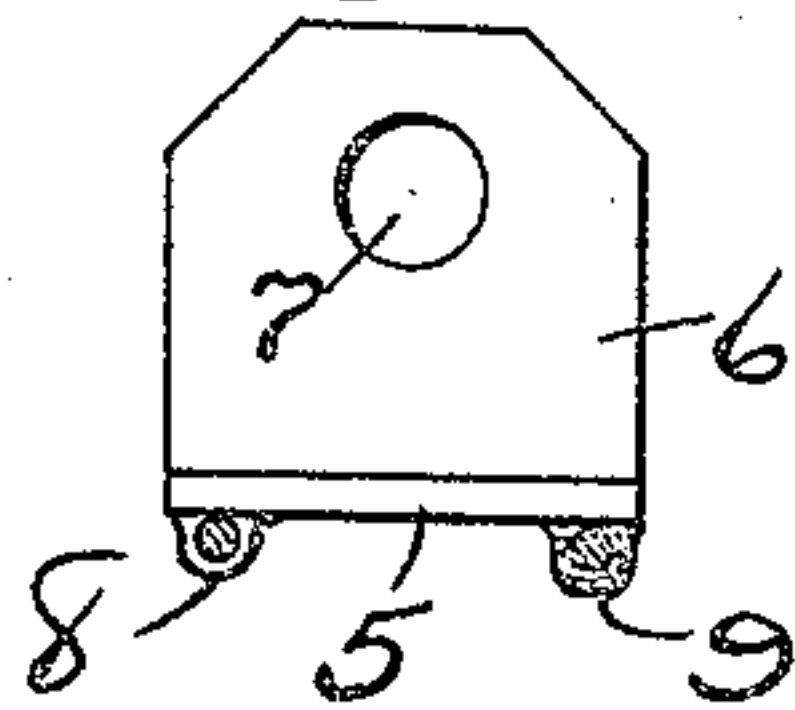
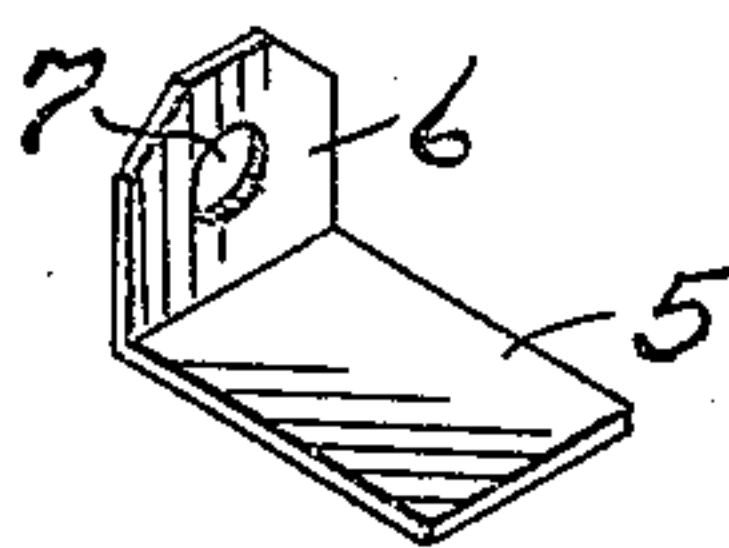


Fig. 5.



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DETONATOR SAFETY DEVICE

Application filed July 12, 1932. Serial No. 622,166.

This invention relates to safety devices for electric detonators and its general object is to provide a detachable clip for normally connecting the exposed portions of the lead wires to the detonator together, so as to provide a short circuit to prevent premature explosion in the event the lead wires should accidentally come in contact with a source of electric energy.

A very important object of the invention is to provide means whereby the clip can be removed from the lead wires, at a safe distance from the detonator after the latter has been set, and this function is accomplished by merely pulling upon the lead wires at a place of safety, or adjacent to the source of electric energy used for exploding the detonator.

Another object of the invention is to provide a safety device of the character set forth, that is simple in construction, inexpensive to manufacture, provides for the greatest possible safety, and is extremely efficient in operation and service.

This invention also consists in certain other features of construction and in the combination and arrangement of the several parts, to be hereinafter fully described, illustrated in the accompanying drawing and specifically pointed out in the appended claims.

In describing our invention in detail, reference will be had to the accompanying drawing wherein like characters denote like or corresponding parts throughout the several views, and in which:

Figure 1 is a side elevation illustrating our device in use.

Figure 2 is a top plan view of Figure 1.

Figure 3 is an enlarged fragmentary view illustrating the clip for connecting the wires together.

Figure 4 is a sectional view taken approximately on line 4—4 of Figure 3, looking in the direction of the arrows.

Figure 5 is a perspective view of the clip per se.

Referring to the drawing in detail, the letter A indicates a detonator and B the source of electric energy for firing the detonator. In practice, the detonator generally has secured thereto lead wires which are insulated

but have exposed free ends to be arranged in circuit with a source of electric energy or connected to the latter. Due to the fact that the free ends are exposed or in other words have the insulation removed therefrom, these ends may accidentally come in contact with an electric circuit, and thereby result in exploding the detonator prematurely. By using our device, such a casualty could not possibly happen as the lead wires are electrically connected together and in the event the exposed ends of the wires should accidentally come in contact with an electric circuit, the current could not pass to the detonator, regardless of the strength of the current, and if the current is of great strength, the portions of the wire that are connected together may fuse and burn off, thereby completely disconnecting the detonator.

The lead wires in the present instance are indicated by the reference numerals 1 and 2 and are insulated in the usual manner, as well as have one of their ends exposed for connection with the source of electrical energy B. The wires also have their insulation removed at parallel places adjacent to their connection with the detonator as clearly shown in Figures 1 and 2, and these exposed portions which are indicated by the reference numerals 3 and 4 are adapted to have secured there to a clip 5 formed from suitable conductive material so that electric current will pass from one wire to the other, for the purpose of setting up a short circuit in the event that the exposed ends of the wires should come in contact with an electric circuit.

The clip 5 is formed from a single piece of material and has one end portion 6 bent at right angles to its body and this end portion is provided with an opening 7 for a purpose which will be later described.

One of the exposed portions may be spot welded or permanently fixed to the body of the clip 5 and for distinction, we have shown the exposed portion 3 secured accordingly as at 8 to the body, while the exposed portion 4 is lightly soldered as at 9.

The lead wires are not only provided with suitable insulation, but are provided with a casing for holding them associated, and con-

5 nected to the lead wires a considerable distance beyond the exposed portions and to the side opposite the detonator is one end of a flexible element 10 which may be secured to the wires in any suitable manner but it is preferred that the wires be knotted together as at 11, with the flexible element secured to the knot. The flexible element is relatively short and has secured to its opposite end a hook 12 which is adapted to be received in the opening 7.

15 In view of the fact that the flexible element is short, it will be apparent that in order to secure the hook 12 in the opening 7, that it is necessary that the lead wires be looped upon themselves as at 13. While we have illustrated one of the lead wires permanently fixed to the clip 5 and the other lead wire temporarily connected thereto, both of the wires may be permanently fixed thereto, and in that event the clip will be made from soft material that can be easily torn and is split longitudinally for a major portion of its length.

25 From the above description and disclosure of the drawings, it will be obvious that we have provided a safety device to prevent detonators and similar explosives from exploding prematurely, and in the use of the device as shown, the explosive is arranged in the position desired and the hook is placed in the opening 7. The operator then grasps the lead wires at a safe distance or at a point adjacent to the source of electric energy B and pulls upon the wires which will result in the clip being disconnected from the exposed portion 4 so that a circuit can be completed to the detonator. The exposed ends of the wires can then be connected to the source B to close the circuit from the source to the detonator.

It is thought from the foregoing description that the advantages and novel features of our invention will be readily apparent.

45 We desire it to be understood that we may make changes in the construction and in the combination and arrangement of the several parts, provided that such changes fall within the scope of the appended claims.

50 What we claim is:

1. In a safety device for an electric detonator, a pair of insulated lead wires electrically connected to the detonator and having parallel exposed portions arranged adjacent to the detonator, a clip electrically and detachably connecting the exposed portions together to shunt a circuit to the detonator, flexible means adapted to be secured to the lead wires and to said clip respectively whereby upon pulling upon the lead wires at a safe distance from the detonator, the exposed portions are disconnected so that a circuit can be completed to the detonator.

2. In a safety device for an electric detonator, a pair of insulated lead wires adapt-

ed to be electrically connected to the detonator and being provided with parallel arranged disposed portions adjacent to the detonator, a clip detachably and electrically connecting the exposed portions to shunt a circuit to the detonator and being provided with an opening, a flexible element having one end connected to the lead wires, a hook secured to the opposite end of said flexible element and being adapted to be received in said opening, said flexible element being relatively short to provide a loop in the lead wires when the hook is arranged in the opening whereby upon pulling on the lead wires the exposed portions will be disconnected so that a circuit can be completed to the detonator.

3. In a safety device for an electric detonator, a pair of insulated lead wires adapted to have one of their ends electrically connected to the detonator and being provided with exposed portions arranged in parallelism with respect to each other and adjacent to the detonator, a clip of conductive material having one of the exposed portions permanently fixed thereto and the other exposed portion detachably connected thereto, to temporarily shunt a circuit to the detonator, and means having one end secured to the lead wires and its opposite end secured to the clip whereby upon pulling on the lead wires the detachably connected exposed portion will be removed from the clip so that a circuit can be completed to the detonator.

4. In a safety device for an electric detonator, a pair of insulated lead wires adapted to be electrically connected to the detonator and having parallel exposed portions, means for electrically connecting the exposed portions together to shunt a circuit to the detonator, a flexible element having one end secured to the lead wires and its opposite end secured to said means, said flexible element being relatively short to provide a loop in said lead wires between the connection of the flexible element thereto and the exposed portions, whereby upon pulling on the lead wires, the said means will be arranged to disconnect the exposed portions so that a circuit can be completed to the detonator.

In testimony whereof we affix our signatures.

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